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An Investigation of the Dayton Regional STEM School Public-Private Partnerships

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by

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy
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We hereby certify that this dissertation, submitted by Kimberly Poole, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirements for the degree of Doctor of Philosophy.

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An Abstract of a Dissertation Submitted to Nova Southeastern University in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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This dissertation study documents in-depth the exploration of the Public Private Partnerships (PPPs) between the Dayton Regional STEM School (DRSS) and their industry partners as well as the establishment of a framework for evaluating and assessing PPPs. The public-private partnership agreements were studied in order to answer the over-arching research question: How is an effective public-private partnership established, assessed, and evaluated in education? A descriptive case study methodology was used to study DRSS' public-private partnership agreements to determine if goals and objectives were established and whether or not the partnerships met those goals and objectives. This case study also included the development and testing of a proposed evaluation framework that will allow for consistent, systematic inquiry that can produce defensible assertions regarding the assessment and evaluation of public-private partnerships in education.

Results of the case study support the findings that utilization of an evaluation framework can serve to make public-private partnerships more successful. Results also indicated that establishment of goals and objectives enable effective evaluation for informal partnerships but could not be definitively stated for formal partnerships due to the lack of data points. The data from this case study revealed many emergent themes that should be considered in the development of future public-private partnerships. Overall this study contributes to the growing body of knowledge for public-private partnerships in education.

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"A step then one more. A walk becomes a journey. And so a full life." - Lao Tao

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Chapter 1

Introduction

Background of Problem Statement

There are growing concerns in industry and education that there is a lack of an available workforce in the areas of Science, Technology, Engineering and Math (STEM), and that the United States is falling behind in these areas (STEM Beyond the Classroom, 2009). To address this concern, many states have begun creating STEM schools to help cultivate students in STEM areas of study (Drinkwater & Smethurst, 2011). STEM schools are public schools that offer a rigorous, focused curriculum emphasizing science, technology, engineering and math. STEM schools focus on promoting innovation through participation in collaborative, group learning projects (OSLN, undated).

Many of the STEM collaborative, group-learning projects are experiences created through Public-Private Partnerships (PPPs) with institutions of higher education and industry partners. These partnership experiences are designed to create focused, higher-quality student learning in STEM subjects. Definitions of what constitutes a PPP vary widely but center on some type of an agreement between a government and private entity where the private entity delivers a service. This arrangement can be very loose or through a formal contractual arrangement (Educational International, 2008).

As the number of STEM schools continues to grow across the United States and significant investments of tax payer dollars are being made, there is a need to understand the challenges that STEM schools face in creating and utilizing PPPs as well as how to assess and evaluate those partnerships. There has been very little research about what constitutes successful PPPs with industry (Education International, 2008) despite a documented need in literature to evaluate how PPPs work most effectively in different situations (Kowalski, 2010). PPPs have emerged as a viable option in response to increased funding shortfalls as educational institutions turn to industry partners to obtain needed resources (Drinkwater & Smethurst, 2011). Multiple challenges still lie ahead for those engaged in PPPs as researchers continue to find ways to measure the impact of this increasingly common approach in education (Creeden, 2011).

Current research on PPPs is minimal and does not allow rigorous academic study to compare the potential, limitations, and effectiveness of existing PPPs (Lund-Thomsen, 2009). Many of the existing PPPs in education have never been evaluated in order to understand if the partnerships have achieved their goals or purpose (Kowalski, 2010). As the educational community continues to push for increased use of PPPs, it is important for academic researchers to continue to push for further examination of the partnerships (Kowalski, 2010) in the areas of assessment and evaluation methodologies (Lund-Thomsen, 2009).

Understanding the need to provide students with STEM knowledge and skills, the STEM Sub-Committee of Ohio awarded five grants in 2008. One of these grants was awarded to the Dayton Regional STEM School (DRSS) in Dayton, Ohio. The DRSS' mission is to provide students with the skills and knowledge to participate in the high-demand, high-paying careers that are available and growing in the Dayton region (DRSS, 2012). Through development of 26

initial PPPs, DRSS has been able to work closely with Wright State University (WSU) and industry partners to provide the resources necessary to grow the STEM school (WSU, 2008).

Problem Statement

Very little is known about the types of PPPs that exist in education and what factors contribute to their success (Kowalski, 2010). Frameworks for assessing and evaluating PPPs are lacking in the education domain (Lund-Thomsen, 2009; Drinkwater & Smethurst, 2011). This dissertation study documents in-depth the exploration of the PPPs between the Dayton Regional STEM School (DRSS) and their industry partners as well as the establishment of a framework for evaluating and assessing PPPs. Because school collaborations and PPPs require significant collaboration among a multitude of parties, they can be extremely challenging. Schools, as well as other domains, seeking to be involved in these types of partnerships can benefit from understanding how DRSS created, utilized, assessed and evaluated their PPPs with industry partners. Improved assessment and evaluation of PPPs in education can lead to successful, deliberate outcomes (Creeden, 2011) and may add insight into partnerships in other domains.

The researcher explored in-depth the PPPs between the DRSS and their industry partners in order to understand how DRSS created and utilized PPPs. The researcher assessed DRSS' initial 26 partnership agreements to determine if goals and objectives were established (Kizlik, 2011) and whether DRSS and partners achieved those goals and objectives. The researcher evaluated (Kizlik, 2011) the partnership agreements to determine value against a proposed theoretical framework using criteria provided by Kowalski (2010).

The challenge of developing and managing PPPs in education has received very little scholarly attention (Kowalski, 2011; Lund-Thomsen, 2009; Thatcher, 2004). As educational partnerships continue to grow in popularity, understanding how to assess and evaluate the

effectiveness of those partnerships continues to be a struggle (Creeden, 2011). Rigorous and early assessments should be conducted from the outset by all partners (Drinkwater & Smethurst, 2011). A review of existing literature has identified a gap in the specific area of assessments and evaluations of PPPs. This research contributes to the body of knowledge specifically for STEM schools in the area of assessing and evaluating PPPs.

Kowalski's (2010) definition provided the most encompassing definition of PPPs and provided the basis of definition for this case-study: "A partnership is a formal arrangement involving two or more parties intended to benefit all collaborators. PPPs specifically include associations between a governmental agency and either a private profit-seeking or private non-profit organization (p. 2)."

Dissertation Goals

Many communities have understood the need for establishing STEM schools that collaborate with industry through PPPs (Bayer, 2010). There is no central source of information for sharing results related to these partnerships. The major goal of this case study was to develop and test an evaluation framework. This major goal would be supported by a sub-goal designed to understand how PPPs were created, implemented, and evaluated at the DRSS utilizing an evaluation framework. Establishing an evaluation framework for assessing and evaluating PPPs at DRSS will enable future schools to leverage this work for partnership building and contribute to the best practices in the areas of PPPs and education.

Research Questions

By examining the DRSS and their PPPs with Wright-State University and industry partners, this researcher sought to answer the following overarching research question: How is

an effective public-private partnership established, assessed and evaluated in education? The overarching research question was guided by, but not limited to, the following:

Q1. How are these partnerships planned, operated, and funded, and what are the challenges?

Q2. What are the goals of such partnerships and how are they measured?

Q3. How is each partnership evaluated and what criteria are used?

Q4. Using Kowalski's criteria as an evaluation framework, how does each partnership arrangement align with this proposed framework?

Q5. What lessons learned can be gained from analyzing data gathered from this evaluation for future public-private partnerships?

Relevance and Significance

Industry partnerships are considered a vital part of a STEM school's success, and a thorough understanding of the challenges of assessing and evaluating PPPs in this context will help ensure success and provide a conceptual foundation for future STEM schools. Although there are methods for evaluating school performance, a literature review revealed that there are no established methods for creating, utilizing, assessing or evaluating PPPs between STEM schools and their industry partners (Kowalski, 2010; Lund-Thomsen, 2009; Thatcher 2004). The analytical framework for a study of the assessment and evaluation of PPPs between industry and STEM schools could not be found by this researcher. This assertion is made based on the absence of literature in this domain, PPP studies, and tangential studies conducted in the areas of collaborative partnerships and university-school partnerships.

Results from this case study provide schools with a framework for the assessment and evaluation of their PPPs. This study has provided information based on actual practice, providing significant value because of the lack of published literature on this topic.

Barriers and Issues

The biggest barrier for this study was the lack of literature available on PPPs in education, in particular with STEM schools. While some important works were located (Barnett, 2010; Bloomfield, 2006; Creeden, 2011; Educational International, 2008; Kowalski, 2010), there is not a plethora of documentation and authoritative data sources on these subjects.

Dr. Jeff Lewis was appointed the Interim Principal/Chief Administrative Officer as of December 2012 and remained the Principal at DRSS for several upcoming school years. Final approval of research studies involving DRSS resided with the Principal and previous principals had supported this case study. Recommendation for approval of this case study was based in part on the recommendation of the Director of Research and Evaluation at DRSS, who had been involved in the reviews of this proposal from its inception and had provided insight and guidance on this case study. Approval to begin the study was received and data collection commenced in March 2014. Privacy issues related to the participant interviews required the data to be handled sensitively, ensuring that company names, proprietary data or relationships were not exposed.

Limitations and Delimitations

There are some limitations inherent in the design of this case study. First, this study is limited by the fact that the qualitative data is self-reported. As a result, there may be missing links between a participant's perception of the questions and their answers or reported attitudes may differ from actual attitudes. Partners may also be inclined to omit any negative data because they did not want to offend DRSS or WSU and put any future opportunities to work together at

jeopardy. Secondly, this study did not explore the impact of partnerships on faculty and staff. The literature review revealed very few instances in PPPs where teachers and staff were the subject of analysis.

Definition of Acronyms

DRSS	Dayton Regional STEM School, Dayton, Ohio
PPP	Public-Private Partnership
STEM	Science, Technology, Engineering and Math
WSU	Wright State University, Dayton, Ohio

Summary

Very little scholarly attention or information is available about the types and successes of PPPs in education and studies on STEM schools are only just emerging. As educational partnerships continue to grow in popularity, understanding how to assess and evaluate the effectiveness of these partnerships continues to be a struggle. Frameworks for assessing and evaluating educational PPPs are also lacking. A literature review revealed that there was no established method of assessing and evaluating PPPs in education. Additionally, of the existing academic partnerships, few have been subjected to any type of in-depth, academic evaluation. This case study contributes to the body of knowledge on STEM Schools and PPPs in the educational domain.

This dissertation documents the investigations of the PPP agreements between DRSS and their industry partners. The major goal of this study was to develop and test an evaluation framework. This framework will allow for consistent, systematic inquiry that can produce defensible assertions regarding the assessment and evaluation of PPPs with STEM schools. The research was guided by the overarching research question: How is an effective public-private partnership established, assessed and evaluated in education?

Chapter 2

Review of the Literature

In order to understand the context and need for this case study, it is vital to understand literature in the domains of STEM schools, Public-Private Partnerships (PPPs) in education, and assessments of PPPs.

STEM Schools

There is a growing concern in industry, as well as in education, regarding the lack of an available workforce in the areas of Science, Technology, Engineering and Math (STEM), and the fact that the United States is falling behind in these areas ("STEM Beyond the Classroom," 2009). To address this concern, many states have created STEM schools to help cultivate students in STEM areas of study. STEM schools are relatively new educational institutions designed to have a rigorous curriculum combined with STEM-related experiences created through PPPs with institutions of higher education and industry partners. These partnership experiences are designed to create focused, higher quality student learning in STEM subjects.

The acronym "STEM" first appeared in 2001 as used by Judith Ramaley, the former Director of the National Science Foundation's Education and Human-Resources Division (TIES, 2011). The acronym "STEM" has been adopted at most local, state, and national levels for a variety of initiatives in addition to education. There appears to be no standard implementation of "STEM" education as it is often defined to include different characteristics:

- A curriculum that replaces traditional lecture-based teaching strategies with inquiry and project-based learning approaches (Breiner, Harkness, Johnson, & Koehler, 2012).

- A focus on the integration of science, technology, engineering and math curriculums to more closely reflect the real-world experience of today's scientist or engineer (ACTE, 2009).
- An interdisciplinary approach where academic concepts are linked with real-world lessons that allow for context and connections to be made with the school, community, work and global economy (Tsupros, Kohler, & Hallinen, 2009).

Even with lacking standard STEM implementations, there is consensus that STEM education represents a concept of how to restructure what is taught in the classroom and what students learn while still adhering to content standards. The focus begins to shift from teaching subjects in silos to teaching more integrated curriculum design with subjects taught in a way that shows their functional relationships. This integrated approach requires schools to re-conceptualize how knowledge in general is conceived, organized, and taught (Breiner, Harkness, Johnson, & Koehler, 2012; Herschbach, 2011).

A review of the literature reinforced the need for STEM education and provided further insight about this important issue. There have been several reports, with various portentous titles, that document the lack of STEM skills in the United States:

- *A Nation At Risk*: The Imperative for Education Form was presented to the Secretary of Education and to the United States Department of Education by the National Commission on Excellence in Education in April 1983. This report addressed how the American educational system is failing to provide a viable, competitive workforce and sparked a wave of local, state, and national reform efforts (National Commission on Excellence in Education, 1983).

- *Before It's Too Late*: A Report to the Nation by the National Commission on Mathematics and Science for the 21st Century was presented to the Secretary of Education by the National Academies of Science in September 2000. This report stated that the United States is not a nation of "world-class learners" when it comes to the subjects of math and science and that to allow this to continue would mean the United States would eventually fall behind in today's integrated, global economy (U.S. Department of Education, 1999).
- *Rising Above the Gathering Storm*: Energizing and Employing America for a Brighter Economic Future was presented to Senator Alexander and Senator Domenici of the Energy Subcommittee of the Senate Energy and Natural Resources Committee by the Committee on Prospering in the Global Economy of the 21st Century in 2007. These senators were asked to hold a series of hearings to identify specific steps that the federal government should take to ensure the primacy of America's science and technology enterprise. The report contained an analysis of how the United States was rated in science and technology and provided recommendations for improving the nation's educational system in the areas of Math and Science (Committee on Science, Engineering and Public Policy, 2007).

All of these reports, compiled over the last three decades, demonstrated a steady decline in the American workforce in STEM areas despite the high level of attention, support, and solutions offered. The reports created an urgency to graduate more students in the STEM fields so the United States could maintain its competitive advantage and not fall behind other countries. This concern remains a genuine issue as supported by various statistics:

- The United States ranked 19th in international assessments of science and 25th in math in a 2003 international study that ranked 57 participating countries (PISA, 2006).
- The United States fell to 21st in international assessments of science and 25th in math in a 2006 international study that ranked 64 participating countries (PISA, 2006).
- The United States fell again to 23rd place in international assessments of science and 30th in math in a 2009 international study (PISA, 2009).
- A 2011 study indicated that the United States is 23rd in international assessments in science but has fallen to 31st in math (Zuckerman, 2011; Hanushek, Peterson, & Woessman, 2011).

These statistics and nation-wide realization of a lagging STEM trained workforce have created an intense interest in STEM schools. As more STEM schools are created to meet this need, the number of PPPs which are created in support of STEM schools will continue to increase.

Understanding how STEM schools create, utilize, assess and evaluate PPPs in education will help those who follow in the STEM school movement to improve the rationale for entering into collaborative efforts and to determine when PPPs are beneficial and when they present too many drawbacks to be effective. Identifying how PPPs are successful, through assessment and evaluation of existing partnerships, will serve to help identify lessons learned and best practices for STEM schools as well as other domains utilizing PPPs.

Public-Private Partnerships in Education

The literature review was started by using key words such as PPPs, partnerships, collaboration, and STEM schools. Because PPPs in education deal with the partnerships between schools and industry, there are many articles published by industry as well as academia.

Industry literature is not always published in scholarly journals, yet serves to provide the industry perspective on this topic and was included in this literature review to ensure a complete review of this topic. A large portion of the industry literature has been published via the internet as well as various forms of official and unofficial company publications.

The term "public-private partnership" encompasses a broad range of definitions, ranging from a formal contracted project to a fully privatized project; still others define it as some type of hybrid approach that distributes risk more evenly among all parties (Education International, 2008). PPPs are not considered "joint ventures" in a business sense but more often describe a situation where there is a shared objective (Widdus, 2005). Most authors agree on the basic premise that PPPs involve public and private interaction to deliver a service (Widdus, 2005; LaRocque, 2006; Norment, 2007; Education International, 2008; Barnett, Hall, Berg, & Camarena, 2010; Kowalski, 2010).

The Norment (2007) in the National Council for PPPs published:

A PPP is a contractual agreement between a public agency (federal, state or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility (p. 4).

Barnett, Hall, Berg, and Camarena (2010) stated the "expressed intent of partnerships is to form an alliance of resources and expertise between organizations aimed at achieving a mutually desired outcome, one that is not likely to be realized without the involvement of both parties." This mutually desired outcome also entails a level of risk sharing by the government

and industry partners that also serves to manage the financial benefits to both parties (Ghana, 2011).

Kowalski (2010) provided an encompassing definition of PPPs that was used for this case-study: "A partnership is a formal arrangement involving two or more parties intended to benefit all collaborators. Public-private partnerships specifically include associations between a governmental agency and either a private profit-seeking or private non-profit organization (p. 4)."

PPPs exist in many domains: government, medicine, construction, transportation, and education to name a few. Motivations for entering into such partnership arrangements vary but both parties perceive that they will provide some contribution and will see some type of benefit from the partnership (Widdus, 2005). PPPs were initially used primarily between government agencies and business. In the last 15 years, there has been a resurgence of PPPs in the educational domain due to increased use of collaboration techniques, as well as issues relating to lack of funding (Widdus, 2005; Bloomfield, 2006; LaRocque, 2006; Hoppe, Kusterer & Schmitz, 2011).

The popularity of PPPs has increased in all domains because their use brings a level of efficiency and reliability not otherwise gained. The level of transparency required in such agreements has brought a large number of projects in on time and on budget, making them attractive to many domains, including education. While the popularity of PPPs is increasing, governments and organizations often resist the concept because of common misgivings and misconceptions relating to difficulty with implementation and contracting, inexperience with PPPs, and a misconception of privatization by the public (PriceWaterHouseCoopers, 2010).

PPPs are not the same as privatization projects which are generally defined as the permanent transfer of control from a public agency to one or more private parties. What is critical in understanding PPPs is that they involve the public and private sectors working together to achieve mutually important goals (Latham, 2009; Robertson & Verger, 2012).

PPPs are increasingly viewed as efficient and effective methods for gaining financial support, political and labor relations skills, real estate savvy and business oriented personnel which are all issues for schools and other domains in these financially restrictive times (Hoppe, Kusterer & Schmitz, 2011; Saussier, 2012). Currently, 25 states have existing PPP legislation in place, while other states are currently reviewing such laws. Legislation is essential to enable PPPs because they typically require transacting a regulated finance arrangement (PriceWaterHouseCoopers, 2010).

The number of PPPs in the educational domain rose dramatically after the release of the 1983 Report, *A Nation at Risk* (Kowalski, 2010) that outlined the growth of PPPs in education:

- Since 1983, the number of schools reporting partnerships has risen from 17% to 40% of all schools and the number is still growing (Marenda, 1989).
- By 1989, over 140,000 businesses were engaged in PPPs with schools (Rigden, 1991).
- It was estimated that by 2000 over several hundred thousand businesses were engaged in PPPs with schools (Partners in Education, 2000).

The above statistics show remarkable increases in the use of PPPs and suggest the collaboration between industry and educational institutions has been productive. Yet, empirical evidence is lacking to support this suggestion because of the lack of scholarly study (Lund-Thomsen, 2009; Kowalski, 2010; Hoppe, Kusterer & Schmitz, 2011).

The terms typically used in defining PPPs also apply to PPPs in education, because they contain many similar components. PPPs are typically:

- Formal in nature
- Long-term affiliations between the partners
- Outcome focused
- A shared risk-taking partnership
- Public, voluntary and commercial partners (Educational International, 2008).

The term "partnership" can have multiple implied meanings such as multi-stakeholder, a pure contractual arrangement that results in a legal contract, a loose or informal agreement to work together that may or may not be documented, or can even be meant to describe an "attitude of reciprocity" (Educational International, 2008).

Patrinos (2006) provided a table outlining the types of contracts found between governments and education (two parties):

Table 1

Types of Contracts in Education

What government contracts for	Definition	Contract Types
Management, professional services (input)	Government buys school management services or auxiliary and professional services	Management contracts Professional services contract (curriculum design)
Operational services (process)	Government buys school operation services	Operational contracts
Educational services (output)	Government buys student placement in private schools (contracts with	Contract for education of specific students

	school to enroll specific students)	
Facility availability (input)	Government buys facility availability	Provision of infrastructure services contracts
Facility availability and educational services (input and output bundle)	Government buys facility availability combined with services (operational or outputs)	Provision of infrastructure contracts with education services contract

The motivations for entering into educational PPPs are centered on the concept of obtaining greater involvement of the private sector to improve and strengthen educational systems and infrastructure. However, studies that have been conducted on the introduction of PPPs in education revealed political motivations for initiating these partnerships as well (Educational International, 2009).

Assessments of PPPs in education do not typically include student outcome data, which means the impact of partnerships on student learning is unknown. Yet studies often document PPP success in terms of higher student performance, smaller class sizes, and improved teaching practices (Educational International, 2009). More attention needs to be given to understanding if partnerships actually enhance the system of education including data relating to a cost-benefit or return on investment analyses (Shaker, 2003).

Assessment of Public-Private Partnerships

Very little scholarly study has been applied to the development and management of partnerships in education (Thatcher, 2004) and studies about STEM schools are only just emerging. PPPs have not yet been studied extensively, and what studies are available are concentrating on the associated contractual frameworks (Saussier, 2012). The literature on the specific topic of STEM schools and PPPs and assessment and evaluation of the partnerships is an

even lesser sub-set of studies. Although methods for evaluating school performance exist and continue to advance, literature regarding what constitutes a successful partnership arrangement is also sparse. Therefore, tangential literature on university-school partnerships, PPPs in education, and corporate-school partnerships was used to form the foundation for the literature review.

An initial review of the literature revealed that the method of assessing and evaluating PPPs in terms of impact on the academic success of the school was unclear and lacking (Kowalski, 2010). Assessments of partnerships hinge on what type of foundational work was completed at the beginning of the partnership and whether goals were identified, roles and responsibilities defined, and a vision established (Thatcher, 2004). There are benefits for companies who participate in educational partnerships, but it is difficult to know what those benefits are if goals were not established and assessments have not taken place (Bayer, 2010).

Of the existing contracted PPPs, very few have been subjected to in-depth, academic evaluation despite making claims of success in the areas of cost effectiveness, equity, increased student performance and cost reductions (Patrinos, 2006). Since many partnerships are starting to develop evaluation plans, no consistent framework has been developed that would bring symmetry to the evaluations. One of the difficulties in evaluating PPPs is that the elements of the agreements are often complicated and boring with many of the specifics hidden from scrutiny by a non-disclosure concept known as “commercial confidentiality” (Educational International, 2009).

Communities are beginning to lean toward creating new models of partnership that are beneficial for both the schools and broader community (Drinkwater & Smethurst, 2011) by focusing on common areas such as leadership, entrepreneurship, and globalism. Partnerships are held together by a structure that operates in the interest of all the parties in the arrangement

(Norment, 2007). PPPs are typically made between business and government with the key tenant being to maximize the strengths of both sectors (Kowalski, 2010; Norment, 2007). There is no way to know for sure if PPPs are beneficial if proper assessment has not taken place.

It is important to define who the participants are in the PPP because the term PPP can describe a wide variety of arrangements. For the purposes of this study, PPP participants are defined as a contractual agreement between a public agency (federal, state or local) and private sector entity (Norment, 2007). Through this partnership agreement, the skills and assets of both components are shared in delivering a service or facility for the use of the public. This sharing of resources also includes the risks and rewards of the venture being undertaken (Education International, 2008). PPPs have been used in a wide range of projects including transportation, water and wastewater, urban development, utilities, financial management, and schools (Norment, 2007).

Summary

Very little scholarly study has been applied to the development and management of partnerships in education. An initial review of the literature revealed that the method of assessing and evaluating PPPs in terms of impact on the academic success of the school was unclear and lacking. Understanding how STEM schools create, utilize, assess and evaluate PPPs in education will help those who follow in the STEM school movement to improve the rationale for entering into collaborative efforts and to determine when PPPs are beneficial and when they present too many drawbacks to be effective. Identifying how PPPs are successful, through assessment and evaluation of existing partnerships, will serve to help identify lessons learned and best practices for STEM schools as well as other domains utilizing PPPs.

Chapter 3

Methodology

Case Study Background

Qualitative research studies often start with "How?" or "Why?" questions which require observation and exploration of a topic and are generally well-suited for case study research (Creswell, 2007). Case studies are defined as "research situations where the number of variables of interest far outstrips the number of datapoints" (Yin, 1994). The term *Case Study* refers to data collection and presentation of detailed information about a person or group where consideration is given to an in-depth study of a particular phenomenon over a period of time (Bronwyn et al., 2012). Case study research involves looking into one or more instances of an issue within a bounded system and does not attempt to control the context of data (Yin, 2009).

Data collection in a case study can come from multiple sources such as interviews, document analysis, and observation. Case studies are a type of qualitative research methodology that are especially well-suited to studying very complex situations (multiple PPPs) that are not well-understood and embedded in their cultural context (STEM School).

Once the case study approach has been established, the researcher must determine the type of case study that will be conducted. Yin (2009) provided three categories of case studies: explanatory, exploratory, or descriptive. Explanatory studies are designed to explore causal links in real-life phenomenon that are too complex for the survey or experimental strategies. Exploratory case studies explore situations where the phenomenon being studied has no clear,

single set of outcomes. Descriptive case studies are used to describe a phenomenon and real-life context in which it occurred (Yin, 2004).

Case Study Approach

Case study research, as a form of qualitative research, can provide a view of a specific instance allowing for more in-depth research that is focused on a bounded system (Baxter & Jack, 2008; Creswell, 2007). A case study of the Dayton Regional STEM School (DRSS) and respective Public-Private Partnerships (PPPs) is appropriate for a qualitative research approach because multiple PPPs allow the researcher to investigate within the bounded system or program of DRSS. Case study research has been applied to this study because the variables within PPPs at DRSS cannot be easily identified and theories need to be developed to assess and evaluate those partnerships.

Yin (2009) offered an approach to understanding whether a case study is suited for a research effort. If the proposed research does not require control of behavior or events, and the focus is on contemporary events, then case study research is well-suited. Within the case study approach, a descriptive case-study was chosen for this research. A descriptive case study allowed the researcher to observe in a real-life context a phenomenon and describe a behavior without influencing it in any way (Baxter & Jack, 2008).

DRSS utilizes many PPPs that represent a cultural instance for STEM schools and is well-suited for case study research. Assessing and evaluating DRSS and their PPPs did not require any manipulation of behaviors or events and involved a contemporary event in that STEM schools are a very new type of school. Multiple sources of data were analyzed to identify specific methods for assessment and evaluation of DRSS PPPs. Yin (2009) suggested that by utilizing multiple sources of data, the researcher can allow for certain inferences to be

legitimately made enabling construct validity. The concept of generalizability is important in case study research and can be established through construct validity which would involve generalizations to the concepts of assessments and evaluations for this research effort as well as through identification of a theoretical proposition (Yin, 2009).

Theoretical Proposition

Many researchers do not believe that case studies are generalizable to populations; however, case studies can be generalizable to a theoretical proposition (Yin, 2009, p.15). Propositions are statements that help direct attention to a characteristic that should be examined in a case study. Yin (2009) stated that case studies are not considered "samples" that represent a population but instead are generalizable to their theoretical proposition where the goal is to expand and generalize theories, not to justify results based on frequency of occurrence. This is the methodology that was used in this case study.

Theoretical propositions for this case study:

TP#1: Public-private partnerships can be formal or informal. If formal, then partnerships are more likely to establish goals and objectives. If goals and objectives are established, progress and success can be assessed.

TP#2: Public-private partnerships should be evaluated using an evaluation framework. If formally evaluated with an evaluation framework, then partnerships will be more successful.

Assessing and evaluating the PPPs between the DRSS and their industry partners facilitated understanding of how the partnerships work, clarified relationships, assisted in understanding and analysis of the objectives, and demonstrated how activities lead to desired outcomes and impacts. An in-depth understanding of this relationship will help STEM administrators face the challenges ahead regarding creating PPPs, establishing best practices for

utilizing partnerships, and creating assessment and evaluation factors. Work relating to establishing a framework for assessment and evaluation of PPPs in education contributes to the body of knowledge and establishes future areas for research.

Research Methodology

The following case study design allows for effective assessment and evaluation of the 26 initial partnerships and application of the proposed evaluation framework. The case study was guided by the overarching research question: How is an effective PPP established, assessed and evaluated in education?

The bounded system is that of the DRSS and WSU. The partnership agreements (26 initial PPPs) available for study provided detailed, in-depth data collection involving multiple sources of information that is rich in context and gives this study great depth (Yin, 2004).

This case study had five phases: Gather Data, Interview Participants, Assessment of PPPs, Evaluation of PPPs, and Finalize Study. Each phase is described below as well as in Figure 1.

- Gather Data. The researcher worked closely with WSU and the DRSS to review all 26 initial PPPs as well as any existing documentation regarding the charter agreements, management agreements, PPP startup and solidification documents, planning documents, legal documents, documents related to goals, missions, visions, and any other applicable documentation related to the 26 initial PPPs.
- Interviews with selected participants. Interviews are useful for getting the story behind the participant's experiences. Interviews, although more time-consuming, are more likely to get all questions answered whereas surveys or questionnaires are not always returned or completely filled out. The general interview guided approach was utilized to

ensure that the same general areas of information were collected from each participant. Interviews were conducted to validate the categories included in the evaluation framework as well as to give each participant an opportunity to communicate their experience in the PPP through guided interview questions. Key personnel were identified, appointments made, interviews conducted, and data from these interviews was compiled. To establish the reliability of the data, the interviewer provided the research participants an opportunity to review and comment on the final version of the interview transcript. All comments were addressed and final approval given thus increasing the reliability of the interview data (Yin, 2009).

- Assessment and evaluation of PPPs. Program assessment and evaluation of a program's processes and outcomes serve to facilitate its development and improvement (OEA, 2005). The researcher reviewed existing program assessments and conducted an evaluation in order to understand what (if any) information had already been documented about the status and direction of the 26 initial PPPs with DRSS. Additionally, this researcher identified existing goals and objectives and conducted an independent assessment of the 26 initial partnerships. Evaluations were performed using the proposed evaluation framework (Table 2). Data from the evaluations were analyzed and documented for emergent descriptions, themes, or issues.
- Finalize Study. After data had been analyzed, any adjustments necessary to the proposed framework were identified and documented. This collection of data was utilized to answer the research questions and to evaluate the utility of the proposed evaluation framework. The proposed research questions were answered and the final report prepared.

- Storage of data. All data have been stored on a personal laptop as well as on an external hard drive (to allow for portability).

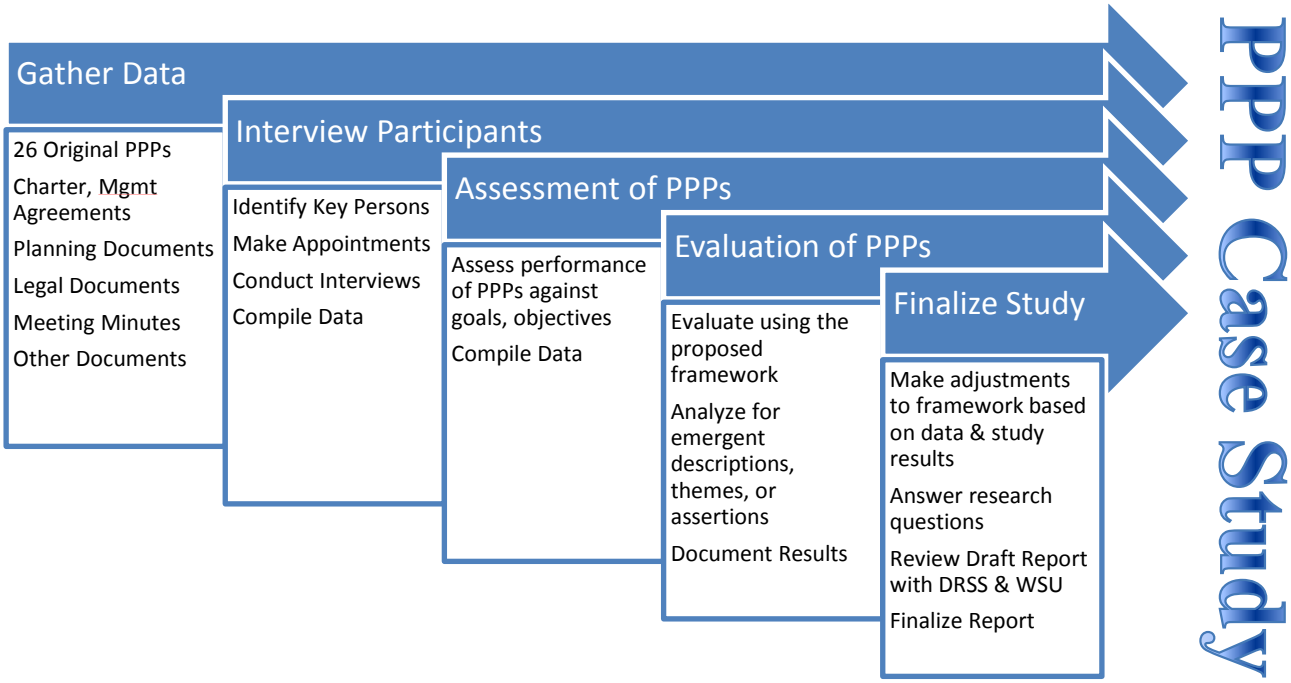

Figure 1 - Case Study Design. This figure shows the five phases of the research study.

Validity and Reliability

Case study research often comes under criticism because many researchers feel that case study research does not adhere to traditional standards set for validity and reliability (Yin, 2009). Current research offers a plethora of methodologies to deal with this concern. To address validity Wolcott (1994) indicated that researchers should strive for "understanding" rather than validity while Eisner (1991) stated that researchers should strive for reasonable standards for judging the "credibility" of qualitative research. For this case study, the researcher employed the methodology provided by Lincoln and Guba (1985) who proposed the use of alternate terminology using terms such as credibility, transferability, dependability, and confirmability. Use of this alternative terminology builds the "trustworthiness" of the qualitative research.

The validation strategy for this case study utilized several methods: Triangulation was used to make use of multiple sources of data to provide 'corroborating evidence' from different data sources; peer review was used to as an external check of the research process; and member checking was conducted where the researcher solicits the participants' views and thoughts on the findings from the case study (Creswell, 2007).

Reliability for qualitative research centers on the concept of replication (Gibbert & Ruigrok, 2010). In order to provide a reliable case study report, the researcher followed the recommendations in regard to data collection including: tape recorded all interviews, carefully transcribed tapes, and made copies of the transcripts available. Reliability also refers to the stability of the responses collected in any interviews or surveys. Creswell (2007) recommended that coders develop a methodology to ensure reliability. The researcher ensured that a solid coding methodology was utilized.

Theoretical Coding of Interview Data

Researchers are often faced with a considerable amount of textual data to analyze after conducting interviews. Coding is a process for organizing the text in interview transcripts and is used for discovering patterns that cannot directly be seen in a massive amount of text. Effective coding should first be done by identifying relevant text that applies to the specific research questions of the study, then by identifying repeating ideas and themes, and then by organizing the themes into theoretical constructs. The theoretical constructs should then be organized into a theoretical narrative which summarizes what the researcher has learned about the research questions. The narrative bridges the research questions to the participant's subjective experience as part of this case study (Auerbach & Silverstein, 2003).

For this study, three of the evaluation framework questions required a coding exercise to create categories for the theoretical narrative (Questions 2, 4, and 18). The data analysis and coding exercise for Questions 2, 4, and 18 are included in Appendices D, E, and F respectively.

Resources

To answer the previously stated research questions, the researcher was provided access to documentation related to the development and status of the 26 initial PPPs between DRSS and their industry partners. In order to facilitate review of documentation, the researcher worked closely with personnel at WSU, of which DRSS is affiliated. The Director of Research and Evaluation at DRSS also facilitated discovery of material and interviews.

Evaluation Framework

A review of the literature revealed that no accepted evaluation framework exists for the purposes of studying PPPs between industry and educational institutions. The development of an evaluation framework allows for consistent, systematic inquiry that produces defensible assertions and quality research regarding the assessment and evaluation of PPPs and educational institutions (Mark, Henry, & Julnes, G., 2000).

Kowalski (2010) cited several outcomes and limiting factors that can be used as criteria for creation of an evaluation framework for PPPs. Four additional questions were added to Kowalski's criteria in order to obtain additional data. This case study sought to evaluate each of the 26 initial DRSS partnership agreements using this resulting evaluation framework. Table 2 provides a detailed description how each research question maps to Kowalski's criteria as well as an explanation of what data can be expected to answer each of the research questions.

Table 2

Evaluation Framework Based on Kowalski's Criteria

Research / Interview Question	Kowalski's Criteria	Kowalski's Explanation
Question 1 Would you consider the partnership between your company and DRSS to be formal or informal?	Does the partnership agreement have a formal and legal purpose?	Evaluations of partnerships which fail to meet this criterion often produce misleading findings and conclusions. *Explanation covers questions 1 & 2
Question 2 Based on your understanding, what was / is the purpose of the public-private partnership between your company and DRSS?		
Question 3 Would you consider this partnership to be a success or failure? If so, why?	Does the partnership agreement have empirical data to support a claim of success or failure?	Declaring a project successful without empirical data can result in goal displacement where the pursuit of the goal becomes more important than the goal itself. *Explanation covers questions 3 & 4
Question 4 In your opinion, what were the main factors that contributed to this success or failure?		
Question 5 At the time the partnership was established, where you aware of any goals and objectives that were defined?	Does the partnership agreement have specific and mutually agreed upon goals?	Partnerships created quickly and with little forethought often did not state specific, measurable goals. *Explanation covers questions 5 & 6
Question 6 If goals and objectives were defined, please describe them.		

Question 7 If goals and objectives were defined, how do / will you know if they have been met?	If so, are these goals measurable?	If goals are not measurable, then success is treated as a relative term and based on opinion.
Question 8 How often has progress been evaluated?	Has the partnership outlived its useful purpose?	Kowalski states that pursuit of a goal despite data that indicates the pursuit is not working is the result of goal displacement.
Question 9 Do you receive any tangible feedback on your partnership effort? If yes, please describe.	*Not from Kowalski's criteria. Rationale for question is to gain insight into the interaction between the school and their partners.	
Question 10 Was this partnership tailored to the specific needs of DRSS? If so, how?	Does the partnership agreement call out tailored reform initiatives?	The partnership agreement should not list generic reform ideas, but address the specific needs of a district or school.
Question 11 Did this partnership provide for any intangible assets to be provided to DRSS?	Does the partnership agreement identify intangible assets provided?	Partnerships often do not identify and capitalize on intangible assets such as first-hand knowledge of classroom problems or creative curricular instructional ideas.
Question 12 Did this partnership provide for any tangible assets to be provided to DRSS?	Does the partnership agreement focus entirely on resource acquisition or does it include any instructional changes that have improved student learning or social and intellectual growth?	Receipt of assets from industry partners has a tendency to create the assumption that school performance has improved; however, resources alone rarely elevate student learning. Focusing on resource acquisition does not automatically correlate to improved student learning.

Question 13 How many employees, besides yourself, participated in the partnership with DRSS? What did they do?	*Not from Kowalski's criteria. Rationale for question is to gain insight into the level of participation from each partner.	
Question 14 In your opinion, was responsibility equally, or near equally, distributed between DRSS and your organization?	Does the partnership agreement specify equal, or near equal, authority and responsibility between or among partners?	Partners who do not feel a sense of ownership of the agreement or may not understand the specific terms of the proposed agreement make evaluation difficult and results unreliable.
Question 15 Did you involve the community in your partnership efforts?	Does the partnership agreement engage in some way with community interest groups?	Sparse attention has been given to the dynamics between partnerships and community interest groups. The influence exerted by the arrangements is unknown.
Question 16 Did you utilize any knowledge or information gained through this partnership experience as a means to try to influence public policy on educational issues?	Does the partnership agreement involve citizens of the community when trying to influence public policy?	Citizens often feel disempowered when public policy is developed in a vacuum.
Question 17 Would you engage in a similar partnership again with another STEM school?	*Not from Kowalski's criteria. Rationale for question is to gain insight into the willingness of the partners to repeat their experience with another STEM school.	
Question 18 Is there anything you'd like to share about this partnership experience with DRSS that you have not already asked about?	*Not from Kowalski's criteria. Rationale for question is to allow participants to communicate information not otherwise addressed in these interview questions.	

Summary

The dissertation documented the investigation of the PPP agreements between the DRSS and their industry partners. The PPP agreements were studied in order to answer the over-arching research question: How is an effective public-private partnership established, assessed, and evaluated in education? A descriptive case study methodology was applied to the study of the PPP agreements to determine if goals and objectives were established and whether or not the partnership agreements met those goals and objectives. Because there was no existing evaluation framework, this case study strived to develop and test an evaluation framework that will allow for consistent, systematic inquiry that can produce defensible assertions regarding the assessment and evaluation of PPPs with STEM schools.

Chapter 4

Results

Background of DRSS

Early in 2007, local businesses and educational institutions joined efforts to see how to take advantage of job growth in the science and technology industries in Dayton, Ohio. As the participants began to identify what skill sets were needed, a void became apparent revealing a need for a well-educated STEM workforce in the Dayton area. At the same time, the State of Ohio alongside local legislators, businesses, and educational institutions, began to partner on a stand-alone public school initiative anchored in two formal partnerships with WSU and the Air Force Research Laboratories. This new school would be called the Dayton Regional STEM School or DRSS.

The mission of DRSS is to "prepare students with the skills necessary to compete in the global economy while nurturing in our young people the same enthusiasm for discovery, invention, and application that launched the vision for powered flight (WSU, 2008, p. 2)." DRSS further describes values that support this mission, including serving as a dynamic teaching and learning community, engaging students and families as a part of a community, serving as a regional resource for teaching and learning, providing inquiry-based STEM learning experiences with real-world scientists, engineers, and technical professionals, and arranging challenging opportunities to demonstrate content mastery while preparing for higher education (WSU, 2008). The school's curriculum is connected to real-world work being done by scientists, engineers,

strategists, planners, innovators, and entrepreneurs throughout the local Dayton, Ohio community.

DRSS is part of the State of Ohio's educational program, but is independent of any school district. DRSS draws their student base primarily from Clark, Greene, and Montgomery counties in Ohio; however, students from other counties are accepted if the school is not at full capacity. DRSS created a Governing Board of approximately 10-15 members responsible for establishing policies and conducting oversight of the school's operations as well as supervising the school Principal. DRSS also has an Advisory Board composed of high-profile community leaders to advise and make recommendations to the Governing Board. The composition of these boards adjusts as the tenure for members expires and new members are brought on board.

WSU provided over 11,000 square feet of space at their University Park location for planning activities and grant writing between 2007 and 2009. The grant was approved and DRSS was formed, funded and opened in 2009. From September of 2009 to August 2012, DRSS occupied the second floor of The Greene Center, a 25,000 square foot facility owned and operated by Clark State Community College. DRSS started with 74 students in 9th grade with plans to expand each year for the next 4 years until reaching planned capacity (See Table 3). In August 2012, DRSS moved to their current facility in Kettering, Ohio as the result of a major renovation project. This expansion project doubled the school's size to more than 70,000 square feet with the addition of more than 23 rooms, improved acoustics, labs with additional sinks, cabinetry and ventilation hoods, and common areas filled with computer stations. The expansion also enabled the school to use their stored wind tunnel and 3D Printer. In June 2013, DRSS graduated the first senior class with 52 students. In 2014, DRSS serviced a total of over 531 students in grades 6-12 with students from 33 school districts in 7 counties (See Table 4).

Table 3

DRSS Expansion by Grade

Year	Grade Level
2009-2010	Grade 9
2010-2011	Grades 8, 9, and 10
2011-2012	Grades 7, 8, 9, 10 and 11
2012-2013	Grades 6, 7, 8, 9, 10, 11 and 12

Table 4

DRSS Grades and Enrollment by Grade Level and Year

Year	Grade	Enrollment
2009-2010	Grade 9	74
2010-2011	Grades 8, 9, and 10	183
2011-2012	Grades 7, 8, 9, 10 and 11	347
2012-2013	Grades 6, 7, 8, 9, 10, 11 and 12	422
2013-2014	Grades 6, 7, 8, 9, 10, 11 and 12	531

Research Participants

The grant proposal to establish DRSS included 26 initial partnerships with industry (WSU, 2008). At the start of data collection, a subsequent review of the partnership list revealed an extensive directory of over 700 partners with varying levels of activity. The list was reduced to a manageable number by determining which partners were considered active with DRSS from inception in 2009 through the end of 2013. A total of 47 partners were identified as active by the school and a total of 21 agreed to participate in this study representing a 44% participation of active partners. Out of the 21, 11 were from the original list of 26 partners, and the remaining 10 became partners after the school's inception. The 21 participants were further grouped by

company type and size (Table 5). Each participant was given a copy of the dissertation proposal to provide the details of the scope of the case study.

Table 5 – Number of Partners Grouped by Type and Number of Companies

Number of Partners Grouped by Type and Number of Companies

Company Type	Number	Type
Educational Institutions	9	
Government	1	
Non-Profit Business/Industry		2
Small Business/Industry		4
Large Business/Industry		5

Using the proposed evaluation framework, each participant responded to the 22 questions. Six questions were for identification purposes (name, date and time of interview, company name, position, phone number), 15 were from the proposed evaluation framework (see Appendix B), and 1 additional open-ended question to allow participants to communicate information not otherwise addressed. All interviews were audio-recorded and each lasted approximately 45 minutes. Theoretical saturation was achieved after 17 interviews as no new information was gleaned from the last 4 interviews. The response data were transcribed and provided back to the participants for editing and approval to ensure accuracy as well as to improve the reliability of the interview data. Interview data were then coded and analyzed for categories and themes as described below. Data used for coding have been provided in Appendices D, E, and F.

Findings and Data Analysis

The following data were obtained through structured interviews with research participants utilizing the proposed evaluation framework as discussed below.

Question 1 – "Would you consider the partnership between your company and DRSS to be formal or informal?"

The research participants self-identified as 2 formal and 19 informal Public-Private Partnerships (PPPs), which reflects the researcher's classification of these partnerships. See Table 9 for further analysis of DRSS' formal and informal partnerships.

Question 2 - "Based on your understanding, what is the purpose of this PPP?"

The research participants provided a total of 49 statements that were used to create 9 themes (See Table 6). Some participants provided more than one statement. For that reason, the analysis is by statements and not by PPP. The data for the coding exercise can be viewed in detail in Appendix D.

Table 6

Percent of Participant Responses by Theme

Themes	% of Responses
1. Support the STEM mission and teachers	24%
2. Participate as a small business owner	16%
3. Provide educational experiences for STEM students	14%
4. Participate in / create STEM school that is project-oriented and reflects real-world environment	12%
5. Be an information broker for DRSS	10%
6. Develop next generation STEM workforce	8%
7. Assist with fund raising	8%
8. Assist with curriculum development	4%
9. Support student activities and mentoring	2%

Notable observations:

- All participants demonstrated a thorough understanding of the purpose of their respective partnerships.
- Student activities (Table 6, Theme #9) consisted of job shadowing, presentations on specific subjects to the students and/or staff, project judges of student work, participation in career fairs, internships, and mentoring.
- The variety of the responses is a direct result of the various phases of development of the school. While in the development phases, partners were asked to assist with curriculum development and to be an information and policy broker for the school. After the school launched in 2009, the focus of these participants became centered on the other elements listed in Table 6.

Question 3 – "Would you consider this PPP a success or failure? If so, why?"

95% of the participants felt the PPP was a success, notable observations included:

- Although 5% of the participants stated they felt the PPP was not a success, all stated they felt their contribution had minimal impact on the success of the school but did not necessarily attribute the partnership to be a failure.
- Question 3 asked for the success or failure factors for the PPP along with "If so, why?" The next question asked for the main factors that contributed to success or failure. The difference between these two questions was difficult for the researcher to explain and caused some general confusion to the research participants. Therefore, it is recommended that the "If so, why?" part of question #3 be deleted from the

evaluation framework because it too closely reflects question #4 which asks for the main factors of success or failure. Each research participant was asked the main factors for success or failure within the context of Question 4 and all data were aligned under Question 4.

Question 4 – "In your opinion, what were the main factors that contributed to this success or failure?"

The research participants provided a total 46 separate statements that were used to create 13 Factors (See Table 7). Some participants provided more than one statement. For that reason, the analysis is by statements and not by PPP. The data for the coding exercise can be viewed in detail in Appendix E.

Table 7

Percentage of Responses Identifying Success or Failure Factors

Factors	% of Responses
1. Relationship management	14%
2. Provided unique expertise	14%
3. Shared knowledge	12%
4. Provided support when asked	12%
5. Engaged students	9%
6. Involved employees	7%
7. Helped develop student skills	7%
8. Engaged as a small business	7%
9. Shared mission	7%
10. Communication	5%
11. Success of the school	3%
12. Quality graduates	2%
13. Clear roles	1%
	100%

Notable observations:

- Communication could be construed as a part of relationship management. However, communication was put in a separate category because none of the research participants used communication as a descriptor. Relationship management consisted of statements such as "allows us to react quickly to the school's need," "relationships often depend on a few key people," "the school could do a better job of marketing themselves," or "we became recruiters of STEM students." Participants listed communication separately as a factor.
- It was unexpected that communication and clear roles were list toward the bottom of the list of success factors.

Question 5 – "At the time the partnership was established, were you aware of any goals and objectives that were defined?"

90% of the participants indicated they were not aware of any defined goals and objectives. Notable observations included:

- 90% of the participants were not aware of any goals and objectives. The results of this question can be compared to the results of Question 2 when 95% of the participants felt the partnership was considered a success. Success should be measured by how well the partnership met the established goals and objectives (among other factors). Success factors, goals and objectives were all considered separate concepts by the research participants. This suggests that success was determined not by measurable goals and objectives, but by participants personal perception of the definition of success for their partnership.

Question 6 – "If goals and objectives were defined, please describe them."

Research participants that positively answered Question 5 and indicated they were aware of goals and objectives described them as follows:

- Getting the school funded and started,
- Getting the curriculum developed, or
- Defining goals/objectives meeting by meeting.

These goals and objectives are very high-level and apply to the partnership as a whole, not necessarily the tasks laid out by each partnership.

Question 7 – "If goals and objectives were defined, how do you know they have been met?"

95% of the participants answered N/A based on their answer to Question 6.

The remaining participants stated they felt goals and objectives were defined as evidenced either by the fact that DRSS is up and running or that while not formally documented, they felt goals and objectives had been met.

Question 8 – "How often is progress evaluated?"

76% of the participants stated progress was not evaluated.

The remaining participants stated that progress checks occurred but took place after each meeting or event. Notable observations included:

- When comparing the results of this question to the results of Question 5, there seems to be some inconsistency. Ninety percent of the participants (Question 5) felt that goals and objectives were not identified while 10% felt that goals and objectives had been identified at a task level. When compared to how often progress is evaluated (see above), 76% of the participants stated that progress was not evaluated. While the percentages are close, these two findings seem to contradict one another in that if

progress is not being evaluated, how can it be determined if goals and objectives were met or not?

Question 9 – "Did you receive any tangible feedback on your partnership effort? If yes, please describe."

81% of the participants stated they did receive tangible feedback. Notable observations included:

- Each participant was asked about the type of tangible feedback they received. The type of feedback fell into two categories:
  - Informal Feedback – Consisted primary of verbal, email, or phone calls. This comprised the most common form of feedback.
  - Formal Feedback – Consisted primarily of hand-written notes, formal letters of appreciation or some form of acknowledgement at a meeting or event.
- Feedback received from students and staff was used to tailor future presentations.
- Personnel turnover and rapid growth phase of DRSS caused some lapses in feedback.
- Personality of key personnel drives the level and quality of feedback.
- Partners specifically like receiving student work for display.
- Communication and relationship management are key factors in terms of effective feedback.

Question 10 – "Was this partnership tailored to the specific needs of DRSS? If so, how?"

57% of the participants stated that the PPP was tailored.

The researcher noted that while more than half of the participants stated the PPP had been tailored, this statistic sharply contrasts with the 90% of the participants who stated that goals and

objectives were not established. Establishing goals and objectives would indicate some measure of tailoring for the partnership had taken place. Other notable observations included:

- Some participants stated the PPP was tailored in the original letter of support attached to the grant proposal by specifically listing the types of support they were willing to provide.
- Some participants stated the PPP was tailored by each event where specific guidelines and lesson objectives were laid out.
- Some participants stated the PPP was open and informal while others stated it was very specific.

Question 11 – "Did this partnership provide for any intangible assets to be provided to DRSS?"

86% of the participants stated intangible assets were provided. Notable observations included:

- Intangible assets specifically mentioned by participants were access to personnel, advertising, and professional development provided at no-cost.
- 70% of the participants stated they had participated in student activities and mentoring.
- 15% of the participants stated they had participated in start-up activities.
- 15% of the participants stated they had participated in curriculum development.

Question 12 – "Did this partnership provide for any tangible assets to be provided to DRSS?"

62% of the participants stated that no tangible assets had been provided. Notable observations included:

- 10% indicated they quantified time spent.

- 10% indicated they quantified equipment donated.
- 20% indicated they quantified money (or money equivalent, i.e., no cost ads).

Question 13 – "How many employees, besides yourself, participated in this PPP?"

Employee participation from partners was categorized as follows:

- 1-5 Employees 62%
- 6-10 Employees 19%
- 11-20 Employees 0
- Over 20 Employees 19%

The original framework question did not provide categories to choose from for the number of employees. The above categories were created based on the participant responses. This research question will be modified to add these categories for ease in evaluating the answers.

Question 14 – "In your opinion, was the responsibility equally, or near equally, distributed between DRSS and your organization?"

71% of the participants stated that responsibility was equally shared. Notable observations included:

- All participants that answered "no," stated that the nature of the partnership meant that responsibility could not be equally shared and that it was not designed to be equal. Reasons mentioned were:
    - DRSS was a start-up phase, partners provided resources that DRSS lacked,
    - DRSS relied heavily on partners during start-up phase, and
    - DRSS communicated what they needed and industry responded.

- Participants that answered "yes," also noted that they felt they were investing in a future labor force that will not pay off in terms of qualified graduates for a long time. They considered their contributions to be an investment in a future work force.

Question 15 – "Do you involve the community in your partnership efforts?

67% of the participants stated they did involve the community. Notable observations included:

- Some participants considered themselves as "the community."
- Some participants stated this was not in the scope of the partnership agreement.
- Some participants specifically highlighted work with other organizations.

Question 16 – "Did you utilize this knowledge and information gained through this partnership experience as a means to try and influence public policy on educational issues?

57% of the participants stated they did not have an opportunity to influence public policy. Notable observations included:

- Participants felt they were able to influence public policy by:
    - Creating a school model that did not fit the more traditional models in Ohio.
    - Creating a type of STEM school that did not exist before (not public, not charter).
    - Establishing a unique way for DRSS to draws funds; the ability to become career-tech oriented.
    - Helping DRSS to access school facility dollars which non-traditional public school were not able to do before.
    - Participating and strengthening policy on credit attainment.
    - Supporting the use of internships in high school.

- Having opportunities to influence at local, state, and federal levels.

- This researcher also noted this question generated considerable discussion and confusion for some research participants. One participant viewed this question in a very negative light while a few others seemed generally confused about the goal of the question. This question will be modified by adding clarifying language to accompany this question on the evaluation framework. Suggested explanation: "For example, are you a member of any committees or work with any local, state, or federal legislators where you have an opportunity to advocate for STEM schools or issues that you have learned about as a result of this partnership?"

Question 17 – "Would you engage in a similar partnership again with another STEM school?"

100% of the participants indicated they would engage in similar partnership agreement with another STEM school. Notable observations included:

- Some participants stated that future engagement would depend on the availability of resources.
- Some participants stated they would like partnerships to be more impactful.
- The new location (Kettering, Ohio) facilitates increased participation from industry.

Question 18 – "Is there anything you'd like to share about this partnership experience with DRSS that I have not asked about?"

The research participants provided a total of 47 statements that were used to create 5 categories (See Table 8). Some participants provided more than one statement. For that reason, the analysis is by statements and not by PPP. The data for the coding exercise can be viewed in detail in Appendix F.

Table 8

Participant Observations & Recommendations for PPPs with DRSS

Category	% of Responses
1. Relationship management is vital to success	41%
2. Community outreach ensures participation	27%
3. Start-up of new school requires enormous commitment and amount of work	12%
4. Emphasize the STEM mission to get support	12%
5. DRSS should create formal fund raising program	8%
	100%

Notable observations:

- Relationship Management was defined by the participants as scheduling partner visits, providing a forum for collaboration, mutual accountability, creating more strategic partnerships now that school growth has slowed, providing a single point of contact to facilitate communication, providing more formality and structure to increase participation, and implementing good business practices that can increase the speed of support provided.
- Community outreach was defined by the participants as DRSS keeping the flow of information going, keeping partners informed of school activities, helping to secure reciprocity, assisting companies who want to help but do not know how, and facilitating coordination of volunteer efforts.
- Start-up of a new school was emphasized by the participants as being an enormous undertaking requiring the participation and skills of many people. The start-up phase

consisted of activities such as defining the mission of the school, deciding where the school should be located, identifying partners, participating in grant writing, providing policy consultants to help eliminate barriers, establishing transportation and meals, hiring staff, creating relationships with policy makers and legislators, and securing funding.

- Emphasizing the STEM mission was defined by the participants as addressing the attrition of engineers, attracting young STEM students, changing the perception of manufacturing jobs, communicating what it takes to grow a business, and sharing what careers are available to STEM students.
- Creating a formal fund raising program was emphasized by several participants. Many partners stated they had not been asked for funding, had only been asked once for funding and not again, or that they wished to contribute but were not aware of the process to do so.

Formal versus Informal Partnerships

DRSS' partnerships were evaluated using Kowalski's (2010) definition of a partnership as "a formal arrangement involving two or more parties intended to benefit all collaborators. Public-private partnerships specifically include associations between a governmental agency and either a private profit-seeking or private non-profit organization (pg. 4)." DRSS functioned as the governmental agency (school) and their industry partners functioned as the private profit-seeking or private non-profit organization. DRSS has a total of two formal PPP agreements: One with WSU and one with the Air Force Research Laboratory (AFRL). As part of this study, these two formal partnerships were compared and contrasted as shown in Table 9.

Table 9

Comparison of DRSS Formal Public-Private Partnerships with WSU & AFRL

WSU	AFRL
Teacher/Employee Focused	Teacher/Student Focused
Monthly Invoicing	Quarterly Reporting
Terminate with 90-days notice	Terminate with 30-days notice
Defines Insurance Terms	Defines Insurance Terms
Retains Ownership of Work Products	Retains Ownership of Work Products
Can Donate Resources	Can Donate Resources
Yearly Period of Performance with Option to Renew each Year	60-Month Period of Performance beginning 2011
No Discussion of Partnership Benefits	Discussed Partnership Benefits for each party
Abide by applicable laws, regulations, codes	Abide by applicable laws, regulations, codes
Did not quantify value of contributions	Quantified the value of each party's contributions
No discussion of mission or objectives	Discussed mission and objectives

The remaining 19 PPP agreements are classified as informal partnerships. DRSS utilizes a high volume of informal PPPs which allows them to react and adapt quickly to meet the needs of the school. For example, in DRSS' start-up phase, they relied heavily on PPP resources for personnel, curriculum development and policy expertise, but now focus primarily on PPP support for student activities since the school has stabilized. Formalized partnerships previously described were created where there was a need to document a more structured relationship.

Addressing the Theoretical Propositions

The following Theoretical Propositions were proposed in Chapter 3 as part of the case study design. The results are presented below.

TP#1: Public-private partnerships can be formal or informal. If formal, then partnerships are more likely to establish goals and objectives. If goals and objectives are established, progress and success can be assessed.

In analyzing the two DRSS formal partnerships, this researcher was unable to definitively answer this theoretical proposition as it relates to formal partnerships. In reviewing documentation for DRSS' two formal partnerships, goals and objectives can be gleaned even though they were not specifically labeled as goals and objectives. However, this lack of specificity can lead to assumptions about goals and objectives that may or may not be correct. It is recommended that goals and objectives be explicitly stated and agreed upon in formal PPPs. Once both partners have agreed to the goals and objectives, progress against those goals and objectives can be assessed. Because of the limitation of only two data points for formal partnerships, further research is needed to gain a better understanding of this theoretical proposition. The results of this future research could warrant further refinement of the evaluation framework.

In analyzing DRSS's informal partnerships, this researcher was able to definitively answer this theoretical proposition. DRSS's informal partnerships did not clearly identify goals and objectives at the informal partnership level. Ninety percent of the participants (Question 5) felt that goals and objectives were not identified while 10% felt that goals and objectives had been identified at a task level. When compared to how often progress is evaluated (Question 8), 76% of the participants stated that progress was not evaluated. If goals and objectives are not

identified, then progress cannot be measured accurately. Therefore, it can be logically concluded that the absence of goals and objectives does inhibit effective evaluation of progress.

TP#2: Public-private partnerships should be evaluated against an evaluation framework. If formally evaluated against an evaluation framework, then partnerships will be more successful.

Results of this case study support the proposition that utilization of an evaluation framework serves to make PPPs more successful by providing a proven method that allows for consistent, systematic inquiry that produces defensible assertions regarding assessment and evaluation. This dissertation served as the first formal evaluation of DRSS partnerships using an evaluation framework and provided DRSS with data not otherwise obtained from their industry partners. DRSS can use these data to refine interaction with their industry partners, to ensure mutual accountability, to conduct partnership planning activities, and to make any adjustments necessary to ensure both parties are satisfied with the partnership.

Summary of the Results

For this case study, the overarching research question was: *How is an effective public-private partnership established, assessed and evaluated in education?* In the case of DRSS, establishing PPPs is a very dynamic and fluid process based on the needs of the faculty and students, current limitations of the school's resources, and the school's mission. The result is informal partnerships are heavily favored over formalized partnerships.

This research study was also guided by several additional research questions. These questions and results are discussed as follow:

Q1. How are these partnerships planned, operated, and funded, and what are the challenges?

DRSS plans and operates PPPs more at the task level based on the pressing needs of the school. For example, if student activities require judges for an upcoming rocket competition project, then judges would be recruited based on partners with expertise in this area. At this time, DRSS does not engage in any PPPs that require a monetary exchange of funds.

Q2. What are the goals of such partnerships and how are they measured?

DRSS has not set any specific goals for their industry partners nor do they have any strategy in place for measuring goals.

Q3. How is each partnership evaluated and what criteria are used?

From the inception of DRSS in 2009, there have been no formal assessments or evaluations of existing partnerships; this dissertation provided the first formal evaluation. DRSS approaches assessment and evaluation more at the task level (by each activity) than at the partnership agreement level. Part of this approach was necessitated by rapid growth as well as a more preferred and fluid approach to handling pressing needs of the school. The result is that DRSS can quickly access businesses based on need, but may lack some insight into the needs and potential contributions and needs of their industry partners.

Q4. Using Kowalski's criteria as an evaluation framework, how does each partnership arrangement align with this proposed framework?

Each partnership was evaluated using the evaluation framework based on Kowalski's criteria. Each partnership measured against this evaluation framework provided meaningful data that could be used to further advance DRSS partnerships. Each partner demonstrated an understanding of the purpose of the partnership, provided meaningful insights into how they

worked with the school, and forward-looking visions in terms of how DRSS fit into the STEM culture in the Dayton area.

Q5. What lessons learned can be gained from analyzing data gathered from this evaluation for future public-private partnerships?

Several lessons learned can be gained as it relates to data obtained from the partners interviewed with the evaluation framework. These lessons learned are discussed as emergent issues in Chapter 5.

This case study also considered two Theoretical Propositions:

TP#1: Public-private partnerships can be formal or informal. If formal, then partnerships are more likely to establish goals and objectives. If goals and objectives are established, progress and success can be assessed.

TP#2: Public-private partnerships should be evaluated against an evaluation framework. If formally evaluated against an evaluation framework, then partnerships will be more successful.

When considering the results of the theoretical propositions, this case study could not definitively state that goals and objectives enable progress evaluation and assessment of success for formal partnerships (TP #1) due to the lack of data points. However, the results did support this assertion for informal partnerships. A logical conclusion would be that these results are generalizable to formal partnerships, but further study is needed before this assertion can clearly be made. Results are positively indicated that use of an evaluation framework provides a valuable tool to determine the success of PPPs in the educational domain (TP #2).

The findings from the interviews with DRSS industry partners revealed a well-informed partner-base that understands their purpose and is exceptionally supportive of DRSS. Research

participants provided a significant amount of data that can be used to understand existing partnerships, improve formal partnership agreements, increase participation, and ultimately strengthen bonds with the local community. Participants provided a plethora of insightful data that can be used to improve the partnership program at DRSS. This case study contributes to the body of knowledge on STEM Schools and PPPs in the educational domain.

Chapter 5

Conclusions, Recommendations, Implications, Summary

Conclusions

This major purpose of using a case study approach was to offer empirical insights through the study and in-depth exploration of the PPPs between the Dayton Regional STEM School (DRSS) and their industry partners as well as the establishment of a framework for evaluating and assessing PPPs. Analysis of DRSS' partnerships supports the assertion that partnerships do not always have to be defined as a contract that binds the participants but instead can be viewed as a way to structure and organize those relationships. Partnerships should develop a process by which partners work toward a mutually-agreed to goal by sharing some type of resource and then periodically evaluating that progress using an evaluation framework. A recurring evaluation of that partnership is then required to assess the direction of the arrangement and make adjustments where necessary. The result is that partnerships become as much about *process* as about that mutually-agreed-to end goal.

The results of this study suggest that using an evaluation framework helps to make PPPs more successful by establishing goals and objectives that facilitate assessment and evaluation of those partnerships. The research into whether or not formal partnerships are more likely to establish goals and objectives could not be definitively answered due to the lack of data points; however, results are positively indicated for both formal and informal partnerships.

Formal versus Informal Partnerships

Typically, PPPs are created at the highest level of administration, requiring legal review and tight coordination between both organizations. As a result, there is a basic assumption that formal partnerships are better than informal partnerships. This case study has demonstrated that informal partnerships can provide the same structured support as formal partnerships, but in a way that is fluid and dynamic to quickly meet the needs of the school.

When deciding on whether a formal or informal partnership is needed, this case study has documented that for formal partnerships, the delineating factor was whether or not specific terms needed to be agreed upon by both parties. DRSS created formal partnerships with two organizations where specific terms were defined and agreed upon, and created informal partnerships with businesses that served eloquently to meet the needs of the school. Whether formal or informal, the guiding principle needs to be about bringing the right people with the right skill mix into the partnership, establishing a mutually-agreed-to goals, and ensuring both parties have a vested interest in the outcome of the partnership.

Partnerships in Education

Partnership is a widely-used term applied differently in all domains. In education, there is a broad perception of the term that implies cooperation of both parties toward a *mutually-agreed-to goal*. For example, one of the derived goals between DRSS and their industry partners is generating curiosity and interest in STEM disciplines that sparks in high school, transfers to college, and generates future employees in the local area. This is an admiral goal. Yet how will the school and their partners know if this goal has been accomplished?

Additionally, the nature of a mutually-agreed-to goal is that it was developed collaboratively and was explicitly stated. DRSS' informal partnerships are not necessarily collaborative in nature nor do they have explicit goals. DRSS identifies their needs to their industry partners who then make themselves available to support those student activities. Yet, no input on that process is received from their business partners. A true partnership is symbiotic in nature because it is a collaborative, mutually beneficial endeavor between two or more partners and includes a division of labor based on the available contributions and expertise of each partner. DRSS' informal partnerships could more clearly meet this definition by requesting and collecting inputs from their industry partners on a regular basis. By engaging in a formal process of evaluation, DRSS can ensure that the goals for both formal and informal partnerships are agreed to by both parties.

Many companies engage in partnerships as a philanthropic endeavor, not necessarily with the goal of providing specialized support. However, various definitions of governance imply the implementation of policy and provisions that are responsive to the organization's needs. DRSS utilizes informal PPPs as a *form of social governance* to address and support student activities. Social governance is a unique approach toward delivering high quality support for student activities that are relevant in the STEM domain. The uniqueness of social governance is the speed at which knowledge transfer can occur through direct interaction with leaders in STEM fields. Direct access to these business leaders provides DRSS students with a level of responsiveness not readily available, even in collegiate institutions.

Among the challenges of establishing solid partnerships is the lack of *sufficient time and commitment* to the partnership. DRSS definitely displayed the commitment as they quickly expanded during their growth phase, but minimal time was available to devote toward building

deep partnerships with businesses in the local community. As the school stabilized, more time and attention was given to further development of these PPPs.

Formal Evaluation

This dissertation validated the need for formal evaluations of PPPs. Formal evaluations serve as a solid measurement tool to evaluate progress by providing concrete data that reflect changes over time. Informal evaluations often focus on content or performance (e.g., rubrics) but do not provide the same type of concrete data (see Table 9) as formal evaluations. A solid evaluation framework ensures that both participants are on the same page in terms of what can and cannot be learned from assessing the partnership.

This researcher recommends that evaluation using a framework be conducted annually for both formal and informal partnerships. This recommendation is made based on the results of this case study and is supported by Kowalski's (2010) recommendations regarding annual reviews. This annual review would allow the school to establish goals and objectives that apply to all partners and evaluate progress toward those goals and objectives without being intrusive to school activities. At the annual review, partners should be asked to fill out the evaluation framework questionnaire, the results should be compiled and the data used to collaboratively refine partnership activities. This annual review should not be conducted with the entire list of 700+ partners as this would be prohibitive, but only with those whom the school considers active partners within the last 12 months of activities.

All schools, including DRSS, will realize a need to demonstrate how their program has successfully utilized PPPs to deliver increased student services and performance in order to claim success. All partnerships are typically measured by the outcomes of their efforts. If no

formal evaluation takes place, no claims of success can be documented or, at a minimum, understood. Indeed if PPPs are to reach their potential, there must be a level of balanced participation that allows both sides to feel true ownership and pride in the partnership itself. Formal evaluations are the mechanism by which continuous work and improvements are to be made to the partnership. This formal assessment also has benefits for the business partners by increasing their competitiveness in the marketplace, creating social capital, gaining a better understanding of how their experience and services can be utilized at the school, investing in the future work force, and building rapport and relationships within the community.

Emergent Issues for PPPs

In analyzing the data from this study, several emerging themes warrant further discussion and consideration for any school considering establishing PPPs. These lessons learned provided by the DRSS partners provide valuable insight into further improvements that can be implemented or considerations that should be taken into account for future efforts.

The issue of *mutual accountability* was mentioned twice by the research participants and warrants further discussion. Many industry partners intend to help schools through donations of time, equipment, and/or money but have not been bound by the vital link of accountability. Educational partnerships tend to focus on these inputs (time, equipment, money) rather than the outputs or results (increased student development or performance) (Kowalski, 2010). In order to capture valid outputs and results, there is a need to have measurable goals and objectives. Measureable goals and objectives have not been established for DRSS' partnerships and may be problematic for their informal partnerships by reducing the speed and flexibility of those partnerships. If DRSS can collaboratively establish goals and objectives with their partners, then

further assessment and evaluations can take place and be used to establish mutual accountability. The degree of mutuality (i.e., equality in decision-making, exchange of resources, level of participation) is negotiable and develops over time. As evident in this case study, the true power of partnerships stem from the potential of industry partners to add value to the educational domain by bringing diverse skills and business savvy to the table for DRSS students in a way that DRSS could not on their own.

Another common theme mentioned by research participants was that of *relationship management* which was seen as a key factor in the perception of success or failure of the partnership. True partnerships imply a symbiotic relationship that is collaborative and mutually beneficial based on the contributions provided by the expertise of both partners. Relationship management also implies the key trait of reciprocity. While DRSS has a good handle on how to communicate their needs to their business partners, there is not a clear understanding on what their business partners need or want from DRSS. Now that DRSS has stabilized, some effort should be made to reach out to industry partners and engage them in an effort to understand what drives their participation and partners must be willing to participate and provide feedback.

Another area that should be thoughtfully considered relates to *management of staff transitions*. Schools and partners should understand the importance of managing staff transitions and make a targeted effort to understand how potential gaps in personnel coverage and transition will be handled by ensuring appropriate policies and procedures are in place. As people change positions, all partners should make an effort to establish relationships with new employees that have roles in the partnership. It was no coincidence that this topic was mentioned by the research participants because at the time of the research study, the position of Director of Communications and Partnerships was in transition from one employee to another. This

transition left some emails unanswered and some communications not returned. After the position was filled, the new person began to establish contact with DRSS industry partners and this became less of an issue. However, there may have been an interim person assigned to handle communications and this was not necessarily made clear.

As part of the research study, several participants were given the opportunity to discuss matters that had not been explicitly asked about in the interview sessions. Several participants mentioned the lack of a formal *fund raising campaign* by DRSS. Specifically, partners mentioned that they were asked once for money and never asked again, they were not aware of the process by which monetary donations could be made to the school, or were not aware of whether or not the school was in need of monetary donations. Core funding for the school is provided for by the State of Ohio; however, many financial needs of the school have gone unaddressed or uncommunicated to their industry partners. The DRSS Governing Board has begun the process of establishing a formal fund raising effort and it is recommended that this information be widely disseminated to the local community and to all the business partners.

Limitations of Research

There are some limitations inherent in the design of this case study. First, this study is limited by the fact that the qualitative data is self-reported. All the participants described their personal interpretation of the PPP arrangement with DRSS as it related to the evaluation framework questions. The result is that there may be missing links between their perceptions of the questions and their answers or reported attitudes may differ from actual attitudes. Partners may also be inclined to omit any negative data because they did not want to offend DRSS or WSU and put any future opportunities to work together at jeopardy. Second, all the partners

participating in this study were contacted by the researcher and volunteered to be interviewed. Therefore, they represent a self-selected sample of people who were willing to talk about their experiences with the STEM school. Additional insightful data may not have been obtained from all relevant partners. Third, this study did not explore the impact of partnerships on faculty and staff. The literature review revealed very few instances in PPPs in which teachers and staff were the subject of analysis. Schools should make a concerted effort to include faculty and staff input to support the partnership effort. Last, the case study of DRSS involved only two formal partnership agreements, the preponderance were informal partnerships. The lack of formal partnership qualitative data may not provide adequate insight into the suitability of the evaluation framework for formal partnerships. Further testing of this evaluation framework with formal partnerships is warranted.

Recommendations

This researcher acknowledges that no single approach can be cloned or transplanted as it applies to establishing PPPs in the educational domain. Some schools may require the use of formal partnerships while others may rely heavily on informal partnerships. However, the common theme that all success stories have in common is a methodical approach to measuring success based on meeting the goals and objectives. The evaluation framework implemented and modified in this study provides an approach for schools utilizing PPPs in the educational domain. As a result of this case study, some adjustments have been made to the evaluation framework. Further adjustments are expected and hoped for as the framework is tested with other PPP endeavors.

Adjustments to the Evaluation Framework

Based on the findings of this case study, the following suggestions and clarifications are made to the proposed evaluation framework as identified in Table 9. A completely revised and formatted Evaluation Framework has been provided in Appendix C.

Table 10

Adjustments to the Evaluation Framework for Public-Private Partnerships

Original EF Question	Adjustments	Rationale
Question 3 Would you consider this partnership to be a success or failure? If yes, why?	Delete the "If yes, why?" part of Question 3. Better quality data was obtained from Question 4.	Declaring a project successful without empirical data can result in goal displacement where the pursuit of the goal becomes more important than the goal itself.
Question 13 How many employees, besides you, participated in the partnership with the school? 1-5 Employees ☐ 6-10 Employees ☐ 11-15 Employees ☐ 16-20 Employees ☐ 20+ Employees ☐	Added categories for ease of answering the question. Removed "What did they do?" part of the question. This has already been addressed in other parts of the framework.	Gain insight into the level of participation from each partner.
Question 16 Did you utilize any knowledge or information gained through this partnership experience as a means to try to influence public policy on educational issues? For example, are you a member of any committees or work with any local, state, or federal legislators where you have an	Added "For example…" to help participants understand the intent of the question.	Citizens often feel disempowered when public policy is developed in a vacuum.

opportunity to advocate for STEM schools or issues that you have learned about as a result of this partnership?

Process for Successful Partnerships

This case study has demonstrated that a well-established PPP agreement should be created using a process that supports measurement for both formal and informal partnerships. These process steps are outlined below and are supported by the factors contributing to success as identified in Table 6.

Table 11

Process for Successful Partnerships

Process Step	Related Success Factors
1. Identify the need and develop a plan of action including funding or budget	Providing Expertise, Knowledge Sharing, Providing Support
2. Define organizational participation levels needed for collaboration including personnel protocols and proprietary issues	Relationship Management, Employee Involvement, Communication
3. Establish roles and responsibilities	Clear Roles
4. Clearly define goals and objectives and understand how they will be met	Shared Mission, Success of the School, Quality Graduates
5. Establish clear lines of communication – be specific	Communication, Roles, Relationship Management
6. Establish timeline for evaluation of progress	Knowledge Sharing, Engaged Small Businesses, Shared Mission
7. Establish milestones and checkpoints for maintenance of the partnership and future planning activities	Knowledge Sharing, Providing Support, Relationship Management

Implications

This case study provides a scholarly contribution to the growing literature on the topic of PPPs in education by providing useful insights into the problem as well as an evaluation framework. Yin (2009) stated that numerous case studies of the same general phenomenon across locations can form a body of knowledge that permits establishing generalizations that can be further tested and refined. In researching theoretical concepts regarding evaluations in the educational domain, it became apparent that most partnerships are deemed as a success or failure based on criteria that is not founded in theory. Where no theory exists, then as Yin suggested, the first step is begin to build the body of knowledge and test theoretical frameworks to establish theories.

Suggestions for Future Research

Increased student development and performance is considered the most valuable outcome of all PPPs in education (Patrinos, 2006). This case study did not address the impact of partnerships on the academic, social, or physical well-being of students who are the eventual beneficiaries of DRSS partnerships. Kowalski (2010) stated that extent and quality of school improvements should result in a positive effective on student learning or instructional changes that improve student social and intellectual growth. A follow-on research study to investigate the effects of PPPs on student learning and performance, student motivation and curriculum is warranted.

A research study to investigate the impact of PPPs on faculty and staff would also be warranted. Schools should make a concerted effort to include faculty and staff by obtaining their input and building their support for the partnership effort.

Summary

Very little scholarly attention or information is available about the types and successes of PPPs in education and studies on STEM schools are only just emerging. As educational partnerships continue to grow in popularity, understanding how to assess and evaluate the effectiveness of these partnerships continues to be a struggle. Frameworks for assessing and evaluating educational PPPs are also lacking. A literature review revealed that there was no established method of assessing and evaluating PPPs in education. Additionally, of the existing academic partnerships, few have been subjected to any type of in-depth, academic evaluation. This case study contributes to the body of knowledge on STEM Schools and PPPs in the educational domain.

This dissertation documents the investigation of the PPP agreements between the Dayton Regional STEM School (DRSS) and their industry partners. One of the guiding research questions for this study was to develop and test a proposed evaluation framework. This evaluation framework will allow for consistent, systematic inquiry that can produce defensible assertions regarding the assessment and evaluation of PPPs with STEM schools. The research was guided by the overarching research question was: How is an effective public-private partnership established, assessed and evaluated in education?

In the case of DRSS, establishing PPPs is a very dynamic and fluid process based on the needs of the faculty and students, current limitations of the school's resources, and the school's mission. The result is that informal partnerships are heavily favored over formalized partnerships. From the school's inception in 2009, there have been no formal assessments or evaluations of existing partnerships; this dissertation provided that first formal evaluation. DRSS approaches assessment and evaluation more at the task level (by each activity) than at the

partnership agreement level. Part of this approach was necessitated by rapid growth as well as a more preferred and fluid approach to handling pressing needs of the school. The result is that DRSS can quickly access businesses based on need, but may lack some insight into the needs and potential contributions and needs of their industry partners.

This case study also considered two Theoretical Propositions:

TP#1: Public-private partnerships can be formal or informal. If formal, then partnerships are more likely to establish goals and objectives. If goals and objectives are established, progress and success can be assessed.

TP#2: Public-private partnerships should be evaluated against an evaluation framework. If formally evaluated against an evaluation framework, then partnerships will be more successful.

When considering the results of the theoretical propositions, this case study could not definitively state that goals and objectives enable progress evaluation and assessment of success for formal partnerships (TP #1) due to the lack of data points. However, the results did support this assertion for informal partnerships. A logical conclusion would be that these results are generalizable to formal partnerships, but further study is needed before this assertion can clearly be made. Results are positively indicated that use of an evaluation framework provides a valuable tool to determine the success of PPPs in the educational domain (TP #2).

The findings from implementing the evaluation framework with DRSS industry partners revealed a well-informed partner-base that understands their purpose and is exceptionally supportive of DRSS. Research participants provided a significant amount of data that can be used to understand existing partnerships, improve formal partnership agreements, increase

participation, and ultimately strengthen bonds with the local community. Participants provided a plethora of insightful data that can be used to improve the partnership program at DRSS.

This case study also revealed many emergent themes for consideration in development of future PPPs.

- The issue of *mutual accountability* was specifically mentioned by the research participants. Many industry partners continue to support the school through donations of time, equipment, and/or money but have not been bound by the vital link of accountability. The degree of mutuality (i.e., equality in decision-making, exchange of resources, level of participation) is negotiable and develops over time.
- Another common theme stated by research participants was that of *relationship management* which was seen as a key factor in the perception of success or failure of the partnership.
- Also mentioned was the lack of a formal *fund raising campaign* by the school. Specifically, partners mentioned that they were asked once for money and never asked again, they were not aware of the process by which monetary donations could be made to the school, or were not aware of whether not the school was in need of monetary donations.

Based on the findings of this case study, several changes were made to the proposed evaluation framework to clarify questions and make analysis of data easier. A completely revised and formatted evaluation framework has been provided as part of the research study (Appendix C). This case study also demonstrated that a well-established PPP agreement should be created using a process that supports measurement for both formal and informal partnerships.

These process steps are outlined in Table 11 and are supported by the factors contributing to success.

In researching theoretical concepts regarding evaluations in the educational domain, it became very apparent most partnerships are deemed as a success or failure based on criteria that is not founded in any theory. Where no theory exists, the first step is begin to build the body of knowledge and test theoretical frameworks to establish these theories. This case study provided a scholarly contribution to the growing literature on the topic of PPPs in education by providing useful insights into the problem as well as an evaluation framework. This case study can be added to similar works that study the same general phenomenon across locations and therefore, begin to form a body of knowledge that permits establishing generalizations that can be further tested and refined.

Suggestions for future research include a study to investigate the impact of PPPs on faculty and staff as well as a study to address the impact of partnerships on the academic, social, or physical well-being of students who are the eventual beneficiaries of educational partnerships. The extent and quality of school improvements made through PPPs should result in a positive effective on student learning or instructional changes that improve student social and intellectual growth. A follow-on research study to investigate the effects of PPPs on student learning and performance, student motivation and curriculum is warranted.

Appendix A: Consent Form

Consent Form for Participation in the Research Study Entitled: An Investigation of the Dayton Regional STEM School Public-Private Partnerships

Funding Source: None.

IRB protocol #:

Principal investigator
Kimberly S. Poole
Computing Technology in Education
Doctor of Philosophy
421 McIntire Drive, Fairborn OH 45324
(937) 270-8195

For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

What is the study about?
This case study will investigate the public-private partnership agreements between the Dayton Regional STEM School (DRSS) and their industry partners. The public-private partnership agreements will be studied in order to answer the over-arching research question: How is an effective public-private partnership established, assessed, and evaluated in education? A descriptive case study methodology will be applied to the study of 26 initial public-private partnership agreements to determine if goals and objectives were established and whether or not the partnership agreements met those goals and objectives. This case study will also strive to develop and test a proposed evaluation framework that will allow for consistent, systematic inquiry that can produce defensible assertions regarding the assessment and evaluation of public-private partnerships and STEM schools.

Why are you asking me?
The interview is to gather additional data about the PPPs from DRSS and participating industry partners. Interviews would be conducted with at least one person per industry partner agreement as well as with 5-6 personnel from the DRSS for a total of 33 potential interviews.

What will I be doing if I agree to be in the study?
If you agree to participate in this study, you will be asked to participate in an independent interview that will be conducted on a date, time and location convenient for you. At the beginning of the interview, you will be asked to sign a consent form. You will be asked a series of questions, and the entire interview will be voice recorded. Your answers and additional notes will also be recorded by the researcher via a laptop computer in Microsoft Word. The interview

is expected to last no more than one hour.

In the event you experience any stress or anxiety during your participation in this study, you may terminate your participation in the interview at any time.

Is there any audio or video recording?
This research project will include audio recording of the interview questions and answers via a cell phone app called "Smart Voice Recorder" that turns recordings into .mp3 files that can be stored as data files. This audio recording will be available to be heard by the researcher, the IRB, and following Dissertation Committee members.

DISSERTATION CHAIR: Dr. Steven Terrell Department of Computing Technology in Education Graduate School of Computer and Information Science Nova Southeastern University 6100 Griffin Road Ft. Lauderdale, FL 33314 954-262-2084 terrell@nova.edu	DIRECTOR OF RESEARCH AND EVALUATION, DAYTON REGIONAL STEM SCHOOL: Suzanne Franco, Ed. D. Associate Professor, Wright State University 455 Allyn Hall 3640 Colonel Glenn Hwy Dayton, Ohio 45435-0001 Wright State University (937) 775-3673 voice (937) 775-2405 fax suzanne.franco@wright.edu

The recording will be transcribed by the researcher, Kimberly S. Poole. The recording will be kept securely via computer laptop hard drive as well as a backup on an external hard drive. The recording will be kept for an undetermined amount of time for research verification purposes. Because your voice will be potentially identifiable by anyone who hears the recording, the researcher will limit access to the tape and to ensure confidentiality access will be restricted to only persons involved with the dissertation report at Nova Southeastern University and Wright State University.

What are the dangers to me?
The procedures or activities in this study may have minimal risk but may have unknown or unforeseeable risks.

If you have any questions about the research, your research rights, or have a research-related injury, please contact Dr. Steven Terrell at 954-262-2084. You may also contact the IRB at the numbers indicated above with questions as to your research rights.

Are there any benefits for taking part in this research study?
There are no direct benefits.

Will I get paid for being in the study? Will it cost me anything?

There are no costs to you, or payments made, for participating in this study.

How will you keep my information private?
All information obtained in this study is strictly confidential unless disclosure is required by law. The records of this study will be kept private. In any report of this study that might be published, the researcher will not include any personally identifiable information. Research records (transcripts and tape recordings) will be kept in a locked file with an electronic copy on the researcher's laptop and backup drives. Transcripts and tape recordings will be kept for a minimum of 36 months from the conclusion of this study as required by the granting University. The Dissertation Chair and Committee, IRB, regulatory agencies, and student researcher may review these research records.

What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you **before** the date you leave the study will be kept in the research records for 36 months from the conclusion of the study but you may request that it not be used.

Other Considerations:
If significant new information relating to the study becomes available, which may relate to your willingness to continue to participate, this information will be provided to you by the researcher.

Voluntary Consent by Participant:
By signing below, you indicate that

- this study has been explained to you
- you have read this document or it has been read to you
- your questions about this research study have been answered
- you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
- you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
- you are entitled to a copy of this form after you have read and signed it
- you voluntarily agree to participate in the study entitled "An Investigation of the Dayton Regional STEM School Public-Private Partnerships"

Participant's Signature: _____ Date: _____

Participant's Name: _____ Date: _____

Signature of Person Obtaining Consent: _____

Date: _____

Appendix B: Interview Protocol

Interview Protocol
Case Study: An Investigation of the Dayton Regional STEM School Public-Private Partnerships

Interviewee Information:

Date: _____Time: _____

Place: _____

Interviewee's Name: _____

Position : _____

Company: _____

Phone: (_____) _____

Related PPP: _____

Narrative Description of the PPP: _____

_____

_____

_____

_____

The following questions apply solely to the public-private partnership between the company identified above and the Dayton Regional STEM School. All information provided on this questionnaire will kept confidential and sanitized for reporting in the subject research dissertation.

Question 1:
Would you consider the partnership between your company and DRSS to be formal or informal?

Question 2:
Based on your understanding, what is the purpose of this PPP?

Question 3:
Would you consider this PPP a success or failure? If so, why?

Question 4:
In your opinion, what were the main factors that contributed to this success or failure?

Question 5:
At the time the partnership was established, were you aware of any goals and objectives that were defined?

Question 6:
If goals and objectives were defined, please describe them.

Question 7:
If goals and objectives were defined, how do you know they have been met?

Question 8:
How often is progressed evaluated?

Question 9:
Do you receive any tangible feedback on your PPP effort?

Question 10:
Was this PPP tailored to the specific needs of DRSS? If so, how?

Question 11:
Did this partnership provide for any intangible assets to be provided to DRSS?

Question 12:
Did this partnership provide for any tangible assets to be provided to DRSS?

Question 13:
Do your employees, besides yourself, participated in this PPP?

Question 14:
In your opinion, was the responsibility equally, or near equally, distributed between DRSS and your organization?

Question 15:
Do you involve the community in your partnership efforts?

Question 16:
Do you utilize this knowledge and information gained through this partnership experience as a means to try and influence public policy on educational issues?

Question 17:
Would you engage in a similar partnership again with another STEM school?

Question 18:
Is there anything you'd like to share about this partnership experience with DRSS that I have not asked about?

END

Appendix C: Final Evaluation Framework

Final Evaluation Framework for Public-Private Partnerships in Education

Evaluation Framework Question	Rationale
Question 1 Would you consider the partnership between your company and DRSS to be formal or informal?	Evaluations of partnerships which fail to meet this criterion often produce misleading findings and conclusions.
Question 2 Based on your understanding, what was / is the purpose of the public-private partnership between your company and DRSS?	*covers questions 1 & 2
Question 3 Would you consider this partnership to be a success or failure?	Declaring a project successful without empirical data can result in goal displacement where the pursuit of the goal becomes more important than the goal itself.
Question 4 In your opinion, what were the main factors that contributed to this success or failure?	*covers questions 3 & 4
Question 5 At the time the partnership was established, where you aware of any goals and objectives that were defined?	Partnerships created quickly and with little forethought often did not state specific, measurable goals.
Question 6 If goals and objectives were defined, please describe them.	*covers questions 5 & 6
Question 7 If goals and objectives were defined, how do / will you know if they have been met?	If goals are not measurable, then success is treated as a relative term and based on opinion.
Question 8 How often has progress been evaluated?	Kowalski states that pursuit of a goal despite data that indicates the pursuit is not working is the result of goal displacement.

Question 9 Do you receive any tangible feedback on your partnership effort? If yes, please describe.	Gain insight into the interaction between DRSS and their partners.
Question 10 Was this partnership tailored to the specific needs of the school? If so, how?	The partnership agreement should not list generic reform ideas, but address the specific needs of a district or school.
Question 11 Did this partnership provide for any intangible assets to be provided to the school?	Partnerships often do not identify and capitalize on intangible assets such as first-hand knowledge of classroom problems or creative curricular instructional ideas.
Question 12 Did this partnership provide for any tangible assets to be provided to the school?	Receipt of assets from industry partners has a tendency to create the assumption that school performance has improved; however, resources alone rarely elevate student learning. Focusing on resource acquisition does not automatically correlate to improved student learning.
Question 13 How many employees, besides you, participated in the partnership with the school? 1-5 Employees ☐ 6-10 Employees ☐ 11-15 Employees ☐ 16-20 Employees ☐ 20+ Employees ☐	Gain insight into the level of participation from each partner.
Question 14 In your opinion, was responsibility equally, or near equally, distributed between the school and your organization?	Partners who do not feel a sense of ownership of the agreement or may not understand the specific terms of the proposed agreement make evaluation difficult and results unreliable.
Question 15 Did you involve the community in your	Sparse attention has been given to the

partnership efforts?	dynamics between partnerships and community interest groups. The influence exerted by the arrangements is unknown.
Question 16 Did you utilize any knowledge or information gained through this partnership experience as a means to try to influence public policy on educational issues? For example, are you a member of any committee or do you work with any local, state, or federal legislators where you have an opportunity to advocate for schools or issues?	Citizens often feel disempowered when public policy is developed in a vacuum.
Question 17 Would you engage in a similar partnership again with another STEM school?	Gauge the willingness of the partners to repeat their experience with another school.
Question 18 Is there anything you'd like to share about this partnership experience with the school that you have not already asked about?	Allow participants to communicate information not otherwise addressed in prior interview questions.

Appendix D: Question 2 Coding Exercise

"Based on your understanding, what is the purpose of this PPP?"

Each participant statement was analyzed for themes and categories (See Legend: Categories 1 through 9). Once the categories were established, the entire list of statements was reanalyzed to see how many categories applied to each statement. Information that has been redacted or changed to protect anonymity is shown in brackets [xxx].

	Participant Statements	1	2	3	4	5	6	7	8	9
1	Assist the school in its start-up phase; provide authenticity to the school; functioned as a broker, bringing the right people to the table.	X		X				X		
2	Participate as a small business owner.	X								
3	Participate as a small business owner in planned school activities and projects.	X					X			
4	To develop the next generation of STEM workforce; create a STEM school that was project-oriented and reflects real world environment.				X	X				
5	Participate as a small business owner.	X								
6	Assist the school in its start-up phase; took the lead prior to WSU coming on board; functioned as a broker; bringing the right people to the table.			X		X		X		
7	Participate as a small business owner; support the STEM mission & teachers, provide what they needed for students education-wise.	X		X			X			
8	Help with DRSS in their start-up phase, specifically with [certain] activities, planning activities, reporting requirements, student data, etc.							X		
9	Provide volunteer opportunities for our									

	Participant Statements	1	2	3	4	5	6	7	8	9
	employees; matching gift program (company matches monetary contributions), corporate gifts (donation of funds).	X					X			X
10	To assist with marketing the school through recruitment spots, provided for online presentations made available; created some TV spots featuring the principal.			X		X				X
11	We were asked to support various student activities and provide student mentoring.								X	
12	Our purpose was to primarily help out with the grant writing at the state and federal level; some help with fund raising also was provided.					X		X		
13	Our purpose was to primarily help out with the grant writing, professional development, and curriculum development.		X	X						
14	Our organization collects and distributes money; Our purpose was to support the STEM school through funding as well as participate in some of their programs.			X			X			X
15	Mainly knowledge sharing, getting a handle on STEM, networking and best practices.					X		X		
16	We would help the school when asked and provide students with the opportunity to get involved [in our organization] through various activities.			X			X			
17	Our purpose was primarily around facility support for the STEM school; was also an active board member and some staff development.			X		X				

	Participant Statements	1	2	3	4	5	6	7	8	9
18	DRSS needed businesses to offer support for school activities, provide summer internships, and monetary donations.	X					X			X
19	This was mostly a personal effort on my part to pass along knowledge on science and chemicals to students; scientific literacy is an issue.			X	X		X			
20	[Our partnership] laid out the purpose and ground rules [for the partnership]; the purpose was to support the STEM school through various student activities (projects, mentoring, coaches, etc.) as well as provide a member for their governing board; we also provide subject matter experts for [redacted].		X	X	X					
21	To garner support for the school, get exposure of STEM to local businesses, and get students familiar with potential careers.	X		X	X					
	Percentage (# of statements)	16% (8)	4% (2)	24% (12)	8% (4)	12% (6)	14% (7)	10% (5)	2% (1)	8% (4)

Legend:

Participant Statement	
1	Participate as a small business owner
2	Assist with curriculum development
3	Support the STEM mission and teachers
4	Develop next generation STEM workforce
5	Participate in / create STEM school that is project-oriented and reflects real-world environment
6	Provide educational experiences for students
7	Be an information broker for DRSS
8	Support student activities and mentoring
9	Assist with fund raising

Appendix E: Question 4 Coding Exercise

Question 4 – Coding Exercise

"In your opinion, what were the main factors that contributed to this success or failure?"

Each participant statement was analyzed for themes and categories (See Legend: Categories 1 through 13). Once the categories were established, the entire list of statements was reanalyzed to see what categories applied to each statement. Information that has been redacted or changed to protect anonymity is shown in brackets [xxx].

	Participant Statements	1	2	3	4	5	6	7	8	9	10	11	12	13
1	- Allows us to react quickly to school needs							X				X		
2	- People pulling together to get the job done.				X									
3	- Communication from the school on what they needed - Engaging with the students		X			X					X			
4	- Using employees as coaches for DRSS students - Involvement of younger employees - Encouraging critical thinking skills					X	X	X						
5	- Providing support when asked				X									
6	- Clear roles - Ongoing, clear communication - Staying in our swim lane - area of expertise - Acted as a policy partner, not a widely available skill	X	X	X										
7	- Engagement and participation from small businesses.								X					
8	- We provided expertise and skills, at no													

	Participant Statements	1	2	3	4	5	6	7	8	9	10	11	12	13
	charge, that would not have been easily obtained or would have been very expensive for DRSS to obtain.			X										
9	- Company set themselves up to get involved with the community and specifically the STEM school.						X		X					
10	- Our missions matched up well. Our mission was to strengthen the community - to also inspire-inform-educate-engage the community; - instill the joy of learning and the power of diverse perspectives. It fit very well the STEM school's mission.			X		X	X			X	X			
11	Our support has been minimal, we haven't really had a big impact on the school.													
12	We were able to provide support when asked.				X									
13	- We provided support when asked, mostly during the start-up phase. - We lent some equipment which was also returned.				X									
14	We continually learn about high school education helping us understand what high school kids are going through in STEM environment.							X			X	X		
15	- Reciprocity of knowledge sharing. - An openness to discuss topics. - A very good core group of people. - Individual personalities played a big part in success. - However, when you have relationships													

	Participant Statements	1	2	3	4	5	6	7	8	9	10	11	12	13
	that depend on a few key people, then the relationship declines if those people move on--that has happened some with the turnover at DRSS.		X	X							X	X		
16	- We learned a lot about the STEM School - Their students gained an internship experience.					X	X				X			
17	- [Our organizations] continue to have a great relationship; great way to launch a school. - We became recruiters of STEM students from DRSS, - Provide opportunities to access the [certain facilities] and recreational facilities.					X				X	X	X		
18	- They have put forth quality graduates and students, their growth in the grades they service. - The fact the school is up and running and successful speaks for itself. - [Our organization] has a need to be fulfilled, this helps with that. - WSU has played huge part in their success. - They could do a better job at marketing themselves.				X					X			X	X
19	Based on supporting events, personal contact. It's our civic responsibility.				X				X			X		
20	- Students get to spend one-on-one time with brilliant scientists. - We are able to provide subject matter													

	Participant Statements	1	2	3	4	5	6	7	8	9	10	11	12	13
	experts in various areas of technology. - We have access to both [wide range of] scientists.			X						X	X	X		
21	- Earnestness - thinking about what we can do for our partners as well as what they can do for us. - Connecting with partners so as the school grows we have available partners to do - Student activities and mentoring.			X				X	X			X	X	
	54 Total Statements	2% (1)	6% (3)	11% (6)	11% (6)	9% (5)	7% (4)	7% (4)	7% (4)	7% (4)	13% (7)	13% (7)	4% (2)	2% (1)

Legend:

1	Clear Roles
2	Communication
3	Provided Unique Expertise
4	Provided Support When Asked
5	Engaged Students
6	Involved Employees
7	Helped Develop Student Skills
8	Engaged as a Small Business
9	Shared Missions
10	Knowledge Sharing
11	Relationship Management
12	Success of the School
13	Quality Graduates

Appendix F: Question 18 Coding Exercise

"Is there anything you'd like to share about this partnership experience with DRSS that I have not asked about?"

Each participant statement was analyzed for themes and categories (Legend: Categories 1 through 5). Once the categories were established, the entire list of statements was reanalyzed to see what categories applied to each statement. Information that has been redacted or changed to protect anonymity is shown in brackets [xxx].

	Participant Statements	1	2	3	4	5
1	- Successful partnerships engage [certain organizations] to focus on STEM - Wanted to address issue of attrition involving engineers - Want to attract young, smart STEM students - A lot of work goes into creating a new school - A new school requires the involvement of many, many people to help make it happen.	 X X	X		X X	
2	- Single point of contact facilitates communication...very beneficial for flow of information and coordinating volunteer efforts.		X			
3	- Employees participated on company time but had to make up the time they the spent volunteering - Important to note that relationship with the school changes over time - Partner visits are very important - More formality and structure increases participation - Need an understanding of what the school needs help with.		 X X	X X X		
4	- Started Strategic Relationships and Fund Raising committee to assess fund raising needs - Rapid growth of school prevented a lot of the planning activities with partners. - Would like to see more accountability of the partners, many partners are there in name only and don't necessarily contribute to the school in any way. - DRSS should be more selective now that they have time to -- moving partners on and off an active list -- allows the school to be more effective.		X X X			X
5	- Part of what we were designed to do was bring in other partners - LL: we didn't define partnerships clearly enough -		 X	X		

	Participant Statements	1	2	3	4	5
	we found we really needed better definitions of partnerships, better levels of partnerships, and understanding of what it took to get to that point. I advise schools now to do this very early. - Better understanding of the partnership levels and benefits of partnerships. - Understanding what mutual accountability looked like over time.		X X			
	- STEM is creating a "product" (students) for us down the road, we felt it was important to be involved. - Certain concepts grow a business: LL learning, continuous improvement, spirit of entrepreneurship, and collaboration - Critical for the businesses to get engaged so students know what careers are available; doing this at a local, national, and international level is important. - We need to change the student perception of what manufacturing jobs are (not the dirty jobs of the old days).				X X X X	
6	- Our PPP was very parent-like. We provided support during start-up when we were very needed, and as they grew they needed our support less. Now we focus only on supporting student activities.	X	X			
7	- Very important to engage the support and the local community. Where people are engaged, it does wonders. The money follows the volunteers!			X		X
8	Relationship Management is KEY!! - Don't focus on one activity but more on managing that overarching relationship. Our PPP is work-in-progress. We enjoy working on new projects with the school [identified specific projects].		X	X		
9	Also provided support through the [another organization] for various events.			X		
10	We assisted the STEM school with finding their current location (the old value city furniture store) on Woodman Drive. Not really engaged in their day-to-day operations.	X				
11	Our support was very teacher-focused with professional development and curriculum. Helped DRSS in their start-up phase with their difficulty in not being an official school district. The first few years was very rocky, but teachers and staff did tremendous job during that time.	X				
12	We think there should be an increased focus on fund					X

	Participant Statements	1	2	3	4	5
	raising - there is a skill and discipline to it, fund raising attracts partnerships where money might not otherwise be available. - Some discipline and rigor to the partnership process would be helpful, ensure you are always leveraging those partnerships - Don't treat volunteers like employees - you'll burn them out quickly - Good business processes and practices let you do things faster - Keep the scope of what you are doing in line with your resources.		X X X X			
13	Reciprocity makes this work. There is a lot more to be explored by school district. Good time to reconnect with people, figure out how we can collaborate together. Currently, no real forum for this. I think this is why they want to expand their board, because of this issue.		X	X		
14	Relationship Management is KEY!! – [Employee] was great at this. Used a common sense approach but someone needs to be there doing this now that she has left. Provide opportunities for a company to "adopt" the school. Several adoption spots.		X	X		
15	[Specific comments were redacted for anonymity purposes. Content centered around managing their relationship with DRSS as well as various activities that fell under community outreach.]		X	X		
16	Would like to see DRSS do a better job of reaching out to the community through a more formal program now that they have settled a bit. Identifying what it means to be a partner (here's the 18 things we do each year, and how you could help). A lot of companies want to help, but are not sure how to get involved. A formal meeting for an hour or so that talks to how we can help. Also DRSS should have a formal fund raising campaign like the WSU Foundation does. We donated $1k but was never asked to donate again.		X	X X		X
17	The school could do a better job at community outreach, specifically, the community doesn't always hear about what is going on at the school and how they can help. If the community knew more about the school activities, they could support more.			X		
18	DRSS was the first real STEM school in Ohio…there are now more than 10. We were very privileged to be	X				

	Participant Statements	1	2	3	4	5
	the technology anchor for the school. We often take [important high level personnel] to the school to show them how [our organization] can help education future generations and workforce development. It worked for our betterment as well.					
19	We have identified shortages in the STEM schools as it relates to partners in hospital and veterinarians.			X		
	51 Total Statements	12% (6)	41% (21)	27% (14)	12% (6)	8% (4)

Q18 Legend:

1	Startup of a new school requires an enormous commitment and amount of work
2	Relationship management is vital to success
3	Community outreach ensures participation
4	Emphasize STEM mission to get support
5	DRSS Should create formal fund raising program

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